



This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

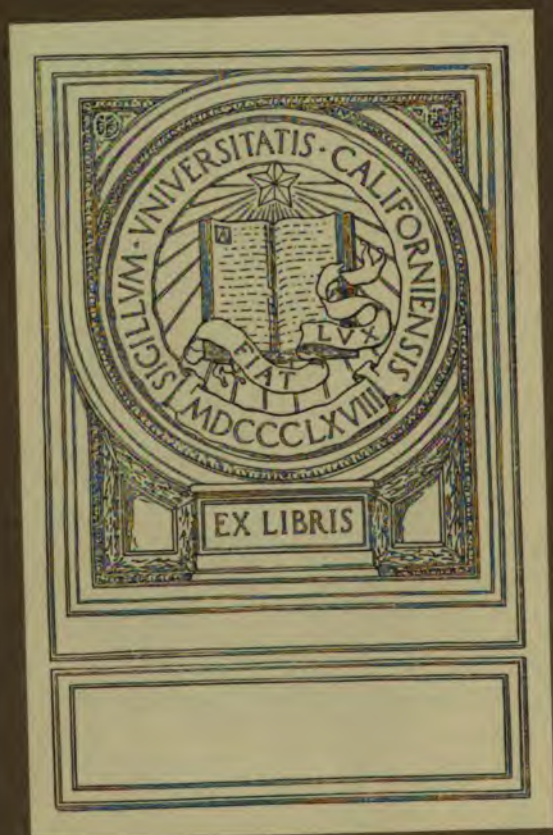
Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

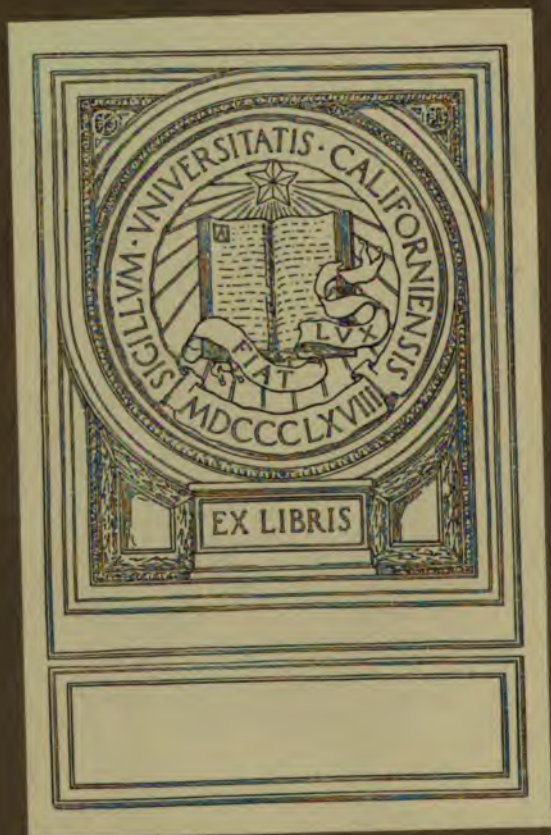
We also ask that you:

- + *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.
- + *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.
- + *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.
- + *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at <http://books.google.com/>





AMERICAN MINE ACCOUNTING

McGraw-Hill Book Company

Publishers of Books for

Electrical World	The Engineering and Mining Journal
Engineering Record	Engineering News
Railway Age Gazette	American Machinist
Signal Engineer	American Engineer
Electric Railway Journal	Coal Age
Metallurgical and Chemical Engineering	Power

AMERICAN MINE ACCOUNTING.

*METHODS AND FORMS
EMPLOYED BY LEADING MINING COMPANIES*

BY

W. H. CHARLTON, P. A.

Member Lake Superior Mining Institute

LIBRARY OF
CALIFORNIA

McGRAW-HILL BOOK COMPANY

239 WEST 39TH STREET, NEW YORK

6 BOUVERIE STREET, LONDON, E. C.

1913

HF5686
.M6C5

COPYRIGHT, 1912, BY THE
MCGRAW-HILL BOOK COMPANY

25774.3

TO VINU
ANSORLIAO

THE MAPLE PRESS YORK PA

PREFACE

While engaged as accountant with various copper-mining companies in the Lake Superior District, covering a period of twelve years, I was impressed with the fact that the subject of mine accounting was not being given the attention in technical literature that it might well receive, there being to my knowledge only three books published on the subject in the English language, one in this country, one in England and one in Scotland.

The result was that I set about the compilation of the material in this volume, which are the practical working systems of companies representative in their particular fields of mining, believing that this treatment of the subject would be more generally appreciated than a theoretical discussion.

I have included in the accounting system of the Ojibway Mining Co. methods for a mill, in order to round out the subject, although this company has not built a mill at the present time.

There will no doubt be found errors, both of omission and commission, although I have endeavored to avoid them as much as possible; however, I will be glad to correct in future editions any inaccuracies that are brought to my attention.

I wish to acknowledge the many courtesies of my friends who assisted in gathering together and preparing the material in this volume. I am particularly thankful to Mr. E. B. Wilson, editor of "Mines & Minerals," for the use of the articles: "Recording Engineering Data at the Calumet & Arizona Mine," "Recording Engineering Data at the Boston & Montana Con. Mine," and "Recording Geological Data at the Calumet & Arizona Mine"; also to Mr. E. E. Whiteley, Mr. Lee Hayes and Mr. Thorald F. Field, the respective authors of these articles. I am also indebted to Mr. L. E. Camomile, Manager of "Mines & Methods," for the use of the material in the chapter on the methods of the Utah Con. Mining Co., which originally appeared in that journal.

In conclusion I commend this volume to the kind consideration of mining men in general and mining accountants in particular, with the hope that it will be of material benefit to the mining industry of this country.

W. H. CHARLTON.

DETROIT, MICH.
December, 1912.

CONTENTS

CHAPTER I

	PAGE
MINING IRON ORE. OLIVER IRON MINING Co.	1
Operating Conditions, Lake Superior District	1
Mines Operated by Oliver Iron Mining Co.	1
General Ledger Accounts, Head Office	3
Sub-ledger Accounts, Head Office	5
General Cost Sheet, Head Office	6
General Office Accounting, Head Office	6
Chart of Mine Accounts, Mine Books, Underground Mines	26
Administrative Expenses, Mine Books, All Mines	28
Distributing Accounts, Mine Books, All Mines	28
Mining Expense Accounts, Mine Books, Underground Mines	32
Surface Expense Accounts, Mine Books, Underground Mines	33
Chart of Mine Accounts, Mine Books, Open Pit Mines	35
Mining Expense Accounts, Mine Books, Open Pit Mines	36
Mine Office, Accounting, All Mines	39

CHAPTER II

MINING AND MILLING NATIVE COPPER. OJIBWAY MINING Co.	58
Operating Conditions, Lake Superior District	58
Head Office Accounts	58
Chart of Mine Accounts, Mine Books	63
General Ledger Accounts, Mine Books	64
Shop Accounts, Side-ledger, Mine Books	74
Closed Accounts, Side-ledger, Mine Books	75
Sub-accounts, Side-ledger, Mine Books	95
General Accounting, Mine Books	107

CHAPTER III

MINING COPPER ORE. UTAH CON. MINING Co.	149
Operating Conditions, Bingham Mining District, Utah	149
Operating Accounts, Mine Books	150
Reports and Graphic Records	152
SMELTING COPPER ORE.—CALUMET & ARIZONA MINING Co.	168
Plant and Smelting Operations	168
Chart of Accounts, Smelter Books	169
Expense Accounts	169
Closed Accounts	174
Shop Accounts	180
Accounting, General Statement	180

CHAPTER IV

	Page
MINING COAL AND MAKING COKE. UTAH FUEL CO.	203
Operating Conditions in Utah	203
Chart of Accounts, General Office	205
General Ledger Accounts	206
Coal Expense Sub-accounts	210
Coke Expense, Sub-accounts	213
General Office Accounting	215
Mine Office Accounting	235
Wasatch Store Co.	268

CHAPTER V

MINING AND MILLING GOLD ORE. THE PORTLAND GOLD MINING CO.	275
Operating Conditions Cripple Creek District, Col.	275
Head Office Accounts	277
Chart of Mine Accounts, Mine Books	282
General Accounts, Mine Books	283
Sub-accounts, Mine Books	285
Distributed Accounts, Mine Books	288
General Statement of Accounting	297

CHAPTER VI

ENGINEERING AND GEOLOGICAL DATA	317
Recording Engineering Data, Calumet & Arizona Mng. Co.	317
Recording Engineering Data, Boston & Montana Con. C. & S. Mng. Co.	325
Recording Geological Data, Calumet & Arizona Mng. Co.	335
INDEX	343

CHAPTER I

MINING IRON ORE

ACCOUNTING METHODS OF THE OLIVER IRON MINING COMPANY

In the Lake Superior District, iron ore is found distributed over a wide area of country. In the Michigan and Wisconsin ranges the ore is found in blanket formations, which are developed by both vertical and inclined shafts, drifts being run into the ore bodies at convenient levels. Stopes are opened into the ore body from the drifts at regular intervals. The ore is broken down in the stopes with machine drills; it is then loaded in cars, trammed to the shaft and hoisted to the shaft house, crushed and either loaded direct into railroad cars for shipment or placed on the stockpile, to await the opening of navigation. From the mines the ore is shipped in railroad cars to the ore docks located at convenient lake ports. From there it is forwarded to Lake Erie ports in steamships.

On the Minnesota ranges the ore is found in blanket formation near the surface of the earth. A great many of these mines are worked as open pits. The surface formation is stripped off the ore by steam shovels. Railroad tracks are laid directly onto the ore body, the ore is broken with dynamite and loaded directly into the railroad cars with steam shovels; it then goes to the ore docks at the nearest lake port, where it is loaded into vessels for shipment to lower lake ports. From the lower lake ports the ore finds its way to furnaces in the Pittsburg District, where it is reduced to commercial iron and steel.

The Oliver Iron Mining Company and its subsidiary companies operate the following mines on the different ranges:

Range	District	Mines
Marquette.....	Marquette.....	Section 21. Section 16. Queen. Hartford. Hard Ore. Hematite. Moore. Stegmiller. Winthrop. Champion.

Range	District	Mines
Menominee.....	Iron Mountain.....	Chapin. Aragon. Cundy. Iron Ridge. Pewabic.
	Crystal Falls.....	Michigan. Mansfield. Riverton. Hilltop. Cuff.
Gogebie.....	Ironwood.....	Aurora. Atlantic. Chicago. Davis. Norrie. Puritan. Tilden.
Vermilion.....	Ely.....	Chandler. Pioneer. Savoy. Sibley. Soudan. Zenith.
	Mountain Iron.....	Mountain Iron Stephens. Virginia. Sauntry. Higgins. Union.
Mesabi.....	Eveleth.....	Adams. Spruce. Auburn. Fayal. Geneo. Duluth. Biwabik. Gilbert. McKinley.

Range	District	Mines
Mesabi.....	Hibbing.....	Burt. Clark. Chisholm. Hull. Pillsbury. Rust. Sellers. Glen. Day. St. Clair. Penobscot. Hull-Rust. Leonard. Mahoning. Hartley. Sharon. Tener. Monroe. Winfield. Morris. Meyers. Donora.
	Colraine.....	Canisteo. Holman. Walker. Hill.

GENERAL LEDGER ACCOUNTING

F ——— **Mine, General Account.**—Representing Inventories of Supplies and Ores, and to balance with Sub-ledger accounts of ——— mine after all entries for the month are made. To receive all charges pertaining to blank mine, as well as profits on sales and to be credited with all sales and transfers to other accounts.

F ——— **Company, General Account.**—To be credited with Inventories, Accounts Receivable, Cash if any, and other investments made by proprietor company with operating company. This account to have no additional entries made therein except to increase or decrease the amount of such investments and to represent the working capital or investment provided the operating company.

F ——— **Company, Operating Account.**—To represent the operations of mines owned by blank company. To be credited with all profits each month or charged with losses as well as amount expended for New

THE COST OF IRON ORE AT THE FURNACE

Profit and Loss		Profit on Sales		Ore at Lower Lake Ports	Freight
Administrative Salaries Printing and Stationery Postage Office Furniture and Fixtures Office Expense Telephone and Telegraph Legal Expense Rentals Traveling and Entertainment Advertising Outside Agencies and Com- missions Special Expense Analysis Prospecting Experimental Work	Earnings	Marine Insurance	Ore at Upper Lake Ports	Lake Freight	
	Operating Expense New Construction	Royalty	Ore at the Mines		Freight
		Improvements		Surface Expense	Mining Expense
		Insurance	Hoisting	Stocking and Sorting Ore	Development in Rock
		Taxes	Shipping Ore from Pockets	Stopping	Development in Ore
		Depreciation	Loading Stockpile, Steam- shovel	Timbering	Stopping
		District Expense	Loading Stockpile, Hand	Picking and Storing Rock	Tramming by hand
		Direct Expense, General office	Stripping	Tramming by power	Cage and Skip tenders
		Loss and Gain	Breaking and Crushing Ore	Pumping	U. G. Tracks
			Surveying and Chemistry	Mining Captains	Shift Bosses and Time- keeper
			Office Expense	Contributions	Dry and Change Houses
			Warehouse	Personal Injuries	Mine Exploration
				General Surface	General U. G. Expense
				Misc.	Rock Filling
				Grading Highways	Steam Shovel

NOTE.—This chart represents the cost from underground mines. Debit accounts are in italics, items appearing below them are either subaccounts or direct charges to the account.

Construction, Plant, etc., and at close of each month to represent liability of operating company to proprietor of mines operated, in addition to liability of General Account.

~~F~~ **Mine, Profit and Loss.**—To represent profits or losses of blank mine for the month and balance transferred each month to operating accounts. This account carried on books to show earnings of each mine by itself and for quick reference.

NOTE.——Mine, General Account

——Mine, Profit and Loss

Above accounts to be carried for each mine operated.

——Company, General Account

——Company, Operating Account

Above accounts to be carried for each proprietor company.

SUB-LEDGER ACCOUNTING

Mining Supplies.....	}	Inventories. To be represented by and balanced against —— Mine, General Account, general ledger.
Ore at Mines.....		
Ore at Upper Ports.....		
Ore at Lower Ports.....		

Mining Labor.....	}	To represent cost of and be closed off to "Ore at Mines."
Mining Supplies Used.....		
Direct Expense, General Office.....		
Misc. Profit and Loss.....		
Insurance.....		
Depreciation.....		

Royalty.....	To be closed off to "Ore at Upper Ports" crediting fee owners royalty, sub-ledger, and Royalty account general ledger.
--------------	------------------------------------------------------------------------------------------------------------------------

Lake Freight.....	}	To be closed off to "Ore at Lower Ports."
Rail Freight.....		
Marine Insurance.....		

Taxes.....	}	Administrative expenses, to be closed off to —— mine, Profit and Loss account, and shown on cost sheet as memo. only.
Interest and Discount.....		
General Expense.....		
Improvements.....		

New Construction.....	To be closed off to General New Construction or operating account of operated mine.
-----------------------	-------------------------------------------------------------------------------------

Misc. Income.....	Represent Rentals, etc., to be closed off to General Ledger accounts or operating account of operated mine.
-------------------	-------------------------------------------------------------------------------------------------------------

Winter Expense.....	}	Deferred charges. To be closed into district accounts and from them to general accounts, and taken up into costs as provided for.
New Shafts.....		
Stripping and Development...		

Accounts Receivable.—It being necessary to a greater or less extent to sell supplies and personal labor, or perform shop labor for outside interests, which is chargeable to accounts receivable, on the General Books, and these charges originating from supplies, labor and profits on same, it is desirable that these come to the General Office from one source only. Therefore the mines will transfer their labor and shop profits to supplies each month and make all charges for Accounts Receivable on (form 115) showing such charges in detail as to the names and amounts. This charge will then correspond in amount with the invoice rendered. The smaller items will be charged to mine or District Accounts Receivable and the larger direct to the party invoiced. Any profit there may be either in supplies or labor will require a journal voucher, charging Supplies and crediting Mine Profit and Loss. This means that including operating and other mine supplies the above will cover all disbursements of supplies of whatsoever nature from the warehouse during the month, except as per form 113.

GENERAL COST SHEET

Mining Labor.....	}	Operating.
Mining Supplies.....		
General Repairs.....		
Direct Expense Mine.....		

TOTAL MINE COST SHEET

Direct Expense, General Office
 Misc. Profit and Loss
 Insurance
 Depreciation

TOTAL COST "ORE AT MINES"

Royalty

TOTAL COST "ORE AT UPPER PORTS"

Rail Freight
 Lake Freight
 Marine Insurance

TOTAL COST "ORE AT LOWER PORTS"

GENERAL OFFICE AND MINE ACCOUNTING

MINE ACCOUNTS—EXPENSE ACCOUNTS

Whenever any of the charges which fall against the expense account noted below pertain to the respective mines of the companies direct, they will be known as *Direct Expense Mine* or *Direct Expense General Office*, according to where the charge originates. When pertaining to

the district or collection of mines in one district, they will be known as *District Expense*. When pertaining to one company, as *General Expense*, and to the mining companies as a whole, *To Company General Expense*, as follows:

Company General Expense.—Expenses pertaining to the companies as a whole, when all mines are equally benefited, such as General Office Rents, Salaries, etc., and will be pro-rated to *General Expense* of the various companies each month on a basis to be determined according to tonnage produced by each, or such other basis as may seem equitable.

General Expense.—Expenses pertaining to one company direct, such as Salaries, Rents, etc., for the benefit of one company to the exclusion of all others as well as proportion of *Company General Expense*, will be treated as Administrative Expense and charged to Profit and Loss, but will, however, be carried as a memo. on the General Office Cost Sheet (pro-rated on a tonnage basis) to show the cost per ton of General Expense, such charge to Profit and Loss being carried through the same accounts in the general office into the Mine Profit and Loss until the end of the year except on mines under operating contracts, when it will be charged each month from Mine Profit and Loss into Operating Account.

District Expense.—Expenses pertaining to a district such as General Superintendent and Clerks salaries, stationery, telegrams, etc., which are paid for the benefit of the district or collection of mines as a whole, such expense to be pro-rated on a tonnage basis and charged to Direct Expense Mine, or General Office, as the case may be according to where the charge originates.

Direct Mine Expense.—Expenses pertaining to a mine direct, such as Superintendent's salary, Rents, etc., paid for the benefit of such mine exclusively, as well as its proportion of District Expense. Direct Expense will be treated as an operating cost and shown on mine cost sheet as "Office Expense." It will be transferred to the General Office on journal voucher of Labor and Supplies (forms 115-6) as part of operating expense and shown on General Office Cost Sheet as Direct Expense Mine.

Direct Expense General Office.—Covering expenditures of same nature as Direct Expense Mine, except that they originate in the General Office and will be treated in same manner except as shown on General Office Cost Sheet as "Direct Expense General Office."

NOTE.—It is desirable to charge expenses as nearly direct as possible, and all expenses should be charged (if applying to one mine directly) to that mine in preference to putting it through the District expense, Direct Expense and General Expense only being used where the expenditures are of a general nature, applying to more than one mine or company.

1. Salaries.—Superintendents and Managers, Officers and Clerks, except telephone and telegraph departments, time-keepers and store-keepers.

2. Printing and Stationery.—Purchased direct or charged from stationery department, including all office supplies, rubber stamps, transfer files, etc., stamped envelopes, and printed postcards (except cost of stamps thereon) which should be charged to No. 3.

3. Postage.—Includes postal cards and stamps on stamped envelopes.

4. Office Furniture and Fixtures.

- A. Furniture, including Desks, Tables, Chairs, Book Cases, filing cabinets, etc.,
- B. Apparatus, including typewriters, calculating machines, check punches, etc.,
- C. Fixtures, including movable partitions, shelving, window shades, etc.,
- D. Repairs, labor and material.

5. Office Expense.—A. Petty office expense, including heat, light, water, ice, janitor, messenger service, etc.,

B. Directors' fees, and corporate expenses,

C. Hotel expenses and lunches, excluding those chargeable to No. 9,

D. Maps, guides, subscriptions, etc.,

E. Moving, changing and repairing office building and partitions, painting, etc.,

F. Payments to banks for handling pay checks.

6. Telephone and Telegraph.

A. Telephone rentals,

B. Telegraph rentals,

C. Telegraphers,

D. Salaries of operators,

E. Toll service.

7. Legal Expense.

A. All court expenses, attorney's fees, etc. (except salaries of regularly employed counsel, chargeable to account No. 1,

B. Registration of deeds, leases, etc.

NOTE.—Above not to include any legal expenses pertaining to personal injury cases; this will be charged to operating.

8. Rentals.

A. Offices,

B. Warehouses,

C. Real estate, including minimum rental of ore properties when same does not apply on future royalty.

9. Traveling and Entertainment.—Includes moving expenses of employees.

10. Advertising.

11. Outside Agencies and Commissions.

A. Expenses, Cleveland Office,

B. Expenses, Pittsburg Office,

C. Commissions on sale of ore.

12. Special Expenses.

A. Detective service,

B. Private cars, expense of officers,

C. Premium on surety bonds,

D. Special expense not otherwise provided for,

E. Donations of the general office.

13. Analysis.—Including the cargo analysis at lower lake ports by independent chemists, analysis at upper lake ports to be pro-rated against mines for which analysis is made.

14. Prospecting.—Examination of properties, analysis, etc. (except laboratory expenses), not to include regular mine prospecting, but applying more directly to new properties.

15. Experimental Work.—Including draughting, laboratory and other work of an experimental nature, outside of regular mine practice (Labor and Supplies).

NOTE.—Form 127 has been provided for the purpose of classifying the expense accounts and should be made up promptly and sent to the General Office for the statical department. This form should be made by the parties handling the accounts as follows:

“Company General Expense” for the full amount of such expense.

“General Expense,” all except proportion of “Company General Expense.”

“Direct Expense Mine,” all except proportion of “District Expense.”

“Direct Expense General Office,” all except proportion of “General” and “District Expense.” The total of the reports making the total expense of the companies as a whole. The form should be checked carefully to see that it agrees for both month and season with the cost sheet, and with forms 115-6 for the month.

NEW CONSTRUCTION ACCOUNTS

F. To this account will be charged the cost of buildings, structures or additions to the company plant, such as new offices, machine shops, blacksmith's shop, power plant, pumping plant, engine houses, shaft house, etc., including all additions to the plant which will increase the value of such plant, and are entirely new.

A separate account will be kept with each item of New Construction.

Nothing to be charged to New Construction account excepting expenditures, which per instructions from the proper authorities, are eventually to be charged to plant account.

As soon as any expenditure to New Construction is authorized the general accounting department is to be notified by a statement detailing the nature of the expenditure and the estimated cost.

The accounting department will give such construction a number and all future correspondence and accounting will refer to it by that number. As soon as such construction is completed and all bills in connection therewith are in, the general office must be notified of its completion.

The mine office will carry such construction on their ledger and make all charges in connection thereto, but such charges are to be no part of operating expenses and will be transferred to the General Office on journal voucher from the pay-roll and stores distribution.

The General Office will carry an account with each New Construction by description and number taking up the charges monthly from the mine vouchers and transferring at completion to New Construction. Upon the completion of such construction the General Office must be furnished with a detailed analysis of same, showing the principal details going into it, at the end of the year transferring all mine New Construction to Plant Account.

Monthly analysis of the account must be furnished the General Office on form 202, Fig. 16.

All charges both labor and supplies against the construction accounts must be made in accordance with the following schedule in order that a proper and comparative cost may be obtained for like buildings or plants.

A. Buildings

- A. Excavation
- B. Grading and filling
- C. Foundation
- D. Superstructure complete except
- E. Brick veneering
- F. Metal sheathing
- G. Lavatories, bath-rooms, light and heating plant
- H. Furnaces, sidewalks, out-buildings, painting, etc.
- I. Misc.

B. Boiler Plants

- A. Excavation
- B. Filling and grading
- C. Foundations
- D. Boilers and breeching
- E. Installation including setting and fittings for boiler

- F. Steam pipe, all steam pipe, valves and fittings in boiler house, and all main steam lines and flanges, separators and traps, connections to surface plant

- G. Water system, all feed water heaters, feed pumps, pipe, valves, fittings, coverings, hangers and supports.

- H. Purifiers, piping and connections

- I. Economizers, installation complete, including flues, dampers, pipe connectors, etc.

- J. Coal hoists complete, including cages and cars

- K. Chimney foundations

- L. Chimneys

- M. Excavation for chimney foundations

- N. Misc.

C. Pumping Plants

- A. Excavation
- B. Grading and filling
- C. Foundations
- D. Pumps
- E. Condensers
- F. Pumping engines
- G. Installation
- H. Steam piping and air lines, including covering and hangers
- I. Water columns, including suction pipe and hangers
- J. Misc.

D. Hoisting Plant

- A. Excavation
- B. Grading and filling
- C. Foundations for engine
- D. Engines
- E. Installation
- F. Piping and connections
- G. Hoisting ropes, sheaves, idler stands, etc.
- H. Cages and skips
- I. Misc.

E. Compressor Plant

- A. Excavation
- B. Grading and filling
- C. Foundations
- D. Compressors
- E. Intercoolers and receivers
- F. Installation
- G. Piping and connections
- H. Steam lines
- I. Air lines
- J. Misc.

F. Shops

- A. Foundations for machinery
- B. Shafting, pulleys and belting
- C. Machine tools each shop
- D. Instal machine tools
- E. Piping and connections
- F. Misc.

G. Shaft Houses

- A. Excavation
- B. Foundations
- C. Shaft houses
- D. Head frame, with timber pocket
- E. Grizzlies
- F. Misc.

H. Trestles

- A. Grading
- B. Coal trestles
- C. Stockpile trestles
- D. Railroad trestles
- E. Piling

I. Equipment

- A. Locomotives, electric and steam
- B. Cars, surface or underground
- C. Steam shovels
- D. Cranes
- E. Misc.

J. Electric Light and Haulage Plant

- A. Motive power
- B. Generator
- C. Switchboard
- D. Installation
- E. Material for line circuit
- F. Installation for line circuit
- G. Piping
- H. Storage batteries
- I. Excavating
- J. Grading and filling
- K. Foundations
- L. Misc.

K. Pipe Lines

- A. Excavation
- B. Pipe and fits
- C. Covers
- D. Installation
- E. Concrete foundations
- F. Misc.

L. Railroad Tracks

- A. Grading
- B. Rails and fastenings
- C. Ties
- D. Installation
- E. Misc.

M. Miscellaneous

- A. Electric wiring
- B. Water tanks
- C. Crushers
- D. Air receivers
- E. Power drills
- F. Diamond or churn drills
- G. Altering and remodeling plant equipment.

Improvements.—To this account will be charged such expenditures as building, remodeling, substitution of new machinery and equipment for worn out or obsolete and kindred outlays for improvement of existing works and foundations. It is quite likely that when improvements as noted are made the new work will undoubtedly be on a larger scale than that supplanted; possibly the cost may exceed that of the original; still it is deemed best in the line of conservatism to care for such improvements through profit and loss. Cases will arise, however, when the improvements may be so extensive or of such nature that in all fairness plant account should have a portion of the expense. In such case it will be proper to distribute a part of the cost. Each improvement should receive special consideration in this particular by the proper officials of the company and expenditures for same cared for on the mine accounts by numbers furnished by the General Office the same as noted above under New Construction.

The expenditures each month will be transferred to the General Office on vouchers showing distribution of supplies and pay-roll.

Each mine must ascertain the probable amounts of improvements contemplated for the current year and during the eight months from April to November, inclusive, send to the General Office monthly a journal voucher for one-eighth of the total. This amount should be adjusted to cover additional requirements as soon as any changes from original estimates are made. The charge will be treated in the General Office in the nature of an Administrative Expense, shown on General Cost Sheet as a memo. only and charged off to profit and loss, through Mine Profit and Loss.

In making up the general balance sheet these two accounts will be stated together,

Improvement fund, \$	
Amount expended since	
Balance.	

If expenditures exceed the provisional charges to Profit and Loss, therefore, the account will be shown as red ink liability. At the close of the fiscal year the balance as above (whether debit or credit) may be made the subject of special consideration, whether it should be finally closed into Profit and Loss, or carried forward to succeeding years. In connection with these expenditures, detailed monthly reports should be made.

Pertinent to the foregoing it is proper to say that occasions will doubtless arise when outlays are to be made for extensive improvements which in fairness to the operations of the years in which the same are

made only a part of the contemplated outlay should be charged thereto. In such event only so much as the proper officials deem the amount the year ought to bear should be included in the provisional charge for the same.

The idea of handling outlays for improvements in the manner outlined is to take care, during the year, in reasonably equitable proportions, of expenditures which strictly speaking are in the nature of (1) a depreciation charge, in that they restore original property worn out or obsolete, and to cover which no provision for depreciation heretofore has been made, and (2) that they include outlays to strengthen the property, which in accordance with the best rules of business practice, a corporation in order to insure its right to live should provide from its current earnings. Monthly analysis of this account must be forwarded to the General Office on form 202, Fig. 16.

NOTE.—An appropriation blank should be made out for every expenditure, chargeable to either Improvement or New Construction, describing the nature of the proposed work and detailing the estimated cost. That when work contemplated provides for transfers of machinery or plant from other properties, the appropriation blank should show the fact and in addition the amount required to instal same.

This appropriation blank should be signed by the Superintendent or General Manager, one copy being sent to the President and two to the Auditor.

F Miscellaneous Profit and Loss.—To this account will be charged or credited, as the case may be, all items of whatsoever nature, originating at the Mine or General Office, which are not directly chargeable to expense accounts, operating or plant accounts, such as receipts from sale of scrap, costs directly chargeable to accidents at the mines, etc., dismantling, handling and reconstructing machinery, etc. In other words, to take care of items not otherwise provided for and to keep accounts provided for on a comparative basis. All expenses of idle mines will be charged to "Mine Profit and Loss," "Winter Expense" if surface mines, which will be charged to Winter Expense and pro-rated against costs during the succeeding season.

NOTE.—No other charges are to be made at the mines to Misc. Profit and Loss unless specially authorized by the General Office, and changes or credits to the account must be fully analyzed on form 202, Fig. 16.

D Insurance.—As no underwriter's insurance will be carried by properties (except boiler insurance, which will be handled through supplies and charged out equitably to steam production) it has been decided that we will carry our own insurance under the direction of the "Insurance Department" of the U. S. Steel Co.

The Manager's duties are:

1. After having made a careful examination of the various plants or properties, by himself or through his Inspectors, he will recommend the amount of Insurance that should be carried on the respective plants, etc., and the rate thereon. When the amounts and rates have been determined, they will be submitted to the President of the company interested for approval. If in his opinion any modifications should be made, they can be adjusted by correspondence or otherwise with the Insurance Department. In case of disagreement, the matter may be referred to the Comptroller for final adjustment.

2. The Inspectors of the Insurance Department will periodically make examination of the various plants for the purpose of ascertaining if proper precautions are taken against fire, and it will be the duty of the manager of the Insurance Department upon receipt of reports from his Inspectors, that proper precautions against fire are not taken, to immediately notify the President of the constituent company interested, making such suggestions for protection or otherwise as may seem in his opinion advisable. The carrying out of the suggestions will be within the discretion of the President of the constituent company interested.

In case of loss by fire the mines should immediately notify the President's office and the Auditor's office so that proper steps may be taken to have the Insurance Department investigate and report on such loss.

The plan as approved for the creation of the Insurance Fund and the disposing thereof is as follows:

After the amount of Insurance to be carried and the rates thereon have been established, as provided above, each company will distribute monthly one-eighth of the amount of premium during the months of April to November inclusive, to its costs of operations, crediting such amount to the "Fire Insurance" Fund. Quarterly each company will remit to the Treasurer of the U. S. Steel Co. in cash the amount of the Insurance Fund so set up for that quarter. The U. S. Steel Co. will credit each company with its contribution and invest the amount so received for the benefit of the fund, allowing each company semi-annually or annually credit for its proportion of the interest or dividends received on the fund, such interest or dividends, however, to be reinvested by the U. S. Steel Co. for the benefit of the fund.

In case of loss by fire, the company sustaining the loss will call upon the U. S. Steel Co. for reimbursement out of the fund; the difference will be charged to Profit and Loss of such company.

This plan is intended to cover Marine Insurance on vessels of the constituent companies, Marine and Fire Insurance on merchandise in transit, and insurance on merchandise stored in outside warehouses.

It will be noted that this plan practically makes each company its own insurer.

Marine Insurance.—As no marine insurance will hereafter be carried with underwriters a provision must be made by charging, "Ore at Lake Erie Ports" and crediting "Marine Insurance" Fund with 1/2 cent per ton (or such other amount as may hereafter be decided upon), for every ton of ore shipped via lakes, based on vessel weights.

Taxes.—The mine office will send on the first of each month from April to November, inclusive, to the General Office, a journal voucher charging Taxes and crediting Taxes Payable, with one-eighth of previous year's taxes paid, if no better information is to be had, and such amount

shown on mine cost sheet. As soon as assessments and rate of tax for current year can be obtained, this account must be adjusted to date by raising the amount to meet new conditions, or lowering it as the case may be.

NOTE.—Insurance and Taxes, except Marine Insurance, will be reported to the General Office for each month from April to November inclusive, such amounts being shown on the mine cost sheets as a memo. only, and taken up in the General Office Cost Sheet under their proper heading, Insurance to Cost of Ore, and Taxes to Administrative Expenses.

Depreciation.—In accordance with the best rules of business practice, a mining company, in order to insure its right to live should provide from its current earnings, a fund sufficient to cover all cost of property by the time its ore reserve is depleted. It is therefore necessary that depreciation be provided for all idle properties, which depreciation should be large enough (based on the best information obtainable for its ore reserve) to cover the total cost of property, including Improvements. The Mine Office should be kept in touch at all times with the General Office on this subject, advising promptly if any changes in conditions affecting ore reserves, which might cause them to increase or decrease the amount of depreciation. Such depreciation to be charged to Cost of Ore and credited to Sinking Fund or Development as the case may be.

5 **Deferred Charges to Operations.**—In order to keep costs at the mines on a comparative basis, it is necessary to defer certain charges and prorate them over the season, and in some cases a term of years. Expenditures of this nature will be transferred to the General Office and remain on the general books as an asset until closed off as depreciation or otherwise. Certain open-pit mines have expenses accumulating during the winter while not producing. These expenditures will be transferred to the General Office monthly, account "Winter Expense." As soon as navigation opens and production commences, such expense must be closed off in equal monthly amounts during the open season to operating costs. The mine making journal voucher charging "Ore at Mines" and crediting "Winter Expense" (Supplies and Pay-roll separately) and take such items into their current Mine Cost Sheet in detail.

Some mines have charges against "Stripping and Development," which expenditure should be transferred to the General Office monthly.

All mines will have charges account "New Shafts," such as Sinking or Raising, and Timbering New Shafts, or lowering old shafts for the further development of ore body. Such expenditures should be transferred monthly to the General Office.

The two latter accounts will be handled in the General Office by depreciation on such basis as will close off the charges before the ore body is depleted.

INVENTORY ACCOUNTS

Mining Supplies.—All purchases or bills of whatsoever nature (excepting insurance and taxes) will be charges to mining supplies account, including freight, Freight Record, form 5, Fig. 1.

All charges to supplies must pass through the storehouse ledger, and be entered under one of the following headings or its sub-division (as many sub-divisions of accounts may be opened as is found necessary for properly keeping track of the stores), allowing the storekeeper to inventory them and check up at any and all times.

A report of all supplies charged will be forwarded to the General Office at the end of each month, showing each invoice, from whom purchased and amount of purchase, Fig. 2, form 236.

SUPPLY ACCOUNTS

FIG. 1.—FORM 5.

Explosives	Power Drill Castings
Candles	Wire Rope
Oils	Carbons
Drill Steel	Manilla Rope
Lumber	Chemicals
Mining Timber	Fuel
Tools	Forge
Steam Packing and Waste	Electric Supplies
Pipe and Fittings	Bolts, Nuts and Washers
Steam and Water Hose	Car and Locomotive Parts
Air Drill Hose	Steam Shovel Parts
Rails	Stationery and Printing
Iron Castings	Misc.

Absolutely no stores of any description will be issued from the store-house without a written order signed by the superintendent, or parties authorized by him, showing for what account the stores are to be issued, and the ticket shall be accepted as a receipt from the party ordering the supplies except in case of contractors, when receipt shall be taken from party to whom supplies are delivered. This ticket will be the store-keeper's authority for making his charges against the proper account. These tickets must be entered up daily in the summary book, and at the end of the month must be summarized and charged to the proper operating or

[illegible]

other account and credited to their proper account in the store-house ledger.

Supplies Consumed.—Form 115, Fig. 14, must cover the total amount of mining supplies consumed or taken out of the storehouse, during the month, except amounts shown on form 113, Fig. 12, pay-roll collections, such supplies being charged to operating, New Construction, Improvements, Accounts Receivable, Cash Sales, or other mine supply accounts. The summary of supplies consumed for the month, form 2, Fig. 10, furnished by the supply clerk, should include every item of supplies distributed during the month, the same being divided into three divisions.

1. Supplies charged to Operating and Construction.

2. Supplies charged to Other Mines.

3. Supplies Sold, which are charged to cash sales, or to Accounts Receivable, as the case may be, a detail of such Accounts Receivable being attached to the journal voucher.

Stores used during the month must be transferred to the General Office by journal voucher (form 115, Fig. 14), showing for what they were used.

Supplies Manufactured.—In manufacturing Tram cars, Skips, Cages, etc., all labor and supplies used in the manufacture of such articles will be charged to supplies, until such articles or series of articles are completed, in order to make one charge to operation or construction when used.

Supplies, Profit and Loss.—As mining supplies cannot come out exactly at the end of the year, it is necessary to charge a small percentage on the stores used during the year to cover leakage, etc., although great care should be used so as not to show any great difference between the book value and the inventory value of this account. Of the two, however, between a loss or gain it should show a small gain. In order to keep the book value of supplies on a par with the actual value, the storekeeper should take inventory of different classifications as often as possible and compare quantities on hand with book quantities, correcting his book quantities to agree with actual inventories and correcting average prices to take care of any discrepancies which he may discover.

Supplies Purchased.—Form 236, Fig. 2. This Statement should cover all purchases of whatsoever nature going into the supply account. The statement on the back should be filled out showing the balance on hand the first of the month, plus purchases for the month as shown on front of the sheet and credited with the three divisions mentioned above, and showing the balance on hand. This statement should agree absolutely with the charges on supply ledger, form 6, Fig. 3, and the three items should agree with the summary of supplies as outlined above.

"Ore at Mines."—Representing cost of producing "Ore at Mines"

until overrun or shortage develops), and to be credited with all sales from Lower Ports at selling value. The difference or profit and loss on sales, debited or credited to this account, as the case may be, to maintain the average cost of ore.

Pay-rolls.—The Pay-rolls at the mines should show each employee, by number, name, and occupation, whether contract or company account rate and amount of wages, deduction if any, balance due employees and separately, amounts due outsiders on account of orders and deductions from employees wages.

The total amount of these orders and balance due employee making the total amount of the monthly Pay-roll.

As soon as the Pay-roll is made out, a voucher (form 116, Fig. 13) must be sent to the General Office, showing the various accounts and to what chargeable, such as:

Direct Expense.....
 Operating.....
 General Repairs.....
 Total Operating.....
 New Construction.....
 Improvements.....
 etc., etc.
 Total Pay-roll.....

The total making the full credit to Pay-roll, plus any credits for sundry items collected from sales and otherwise. Accounts Payable voucher

OLIVER IRON MINING COMPANY							
STATEMENT OF PAY ROLL CHECKS.							
MINE.				PAY ROLL OF _____ 1			
Date	Check No.	PAYEE	Amount	Date	Check No.	PAYEE	Amount
	01				51		
	02				52		
	03				53		
	49				99		
	00				00		
	Forward,				Forward,		

FIG. 4.—FORM 100.

must be made out showing the total amount of the Pay-roll less sundry credits representing collections on Pay-roll, and net amount required to settle the Pay-roll in cash. This voucher will be sent with check to bank handling the mine account, and check passed to credit of the mine,

subject to check of Mine Superintendent or Cashier, less advances made during the month.

A list must be kept of all checks (form 100, Fig. 4) and forwarded to the General Office each month as issued, showing the number of check and amount, spoiled checks being returned to the General Office with such list. All uncalled-for checks at the end of 60 days must be returned to the General Office, where the amount will be placed to the credit of Unclaimed Pay-roll Account, and a record kept of the number, name, month and amount of each. In case check is called for later, it must be paid and charged on petty cash voucher, and the General Office so notified to enable them to correct their record of unclaimed money. Unclaimed Wage account will be closed off to Profit and Loss account every six months, for wages over one year old.

Statistics.—Pay-roll statistics will be sent to the General Office as promptly as possible after the first of the month showing the following information:

“Total amount of Pay-roll” covering the full amount of the regular mine Pay-roll, as well as proportion of District Office Pay-roll chargeable to the mine.

“Total number of days worked,” should cover the full number of days shown on the mine Pay-roll, as well as proportion of days in District Office Pay-roll.

“Total number of names on roll,” covering every name on the Pay-roll without duplication as well as arbitrary proportion of names in District Office Pay-roll.

“Average number of men....days each.” The average number of men will be obtained by dividing the total number of days worked by the number of working days in the month. The working days in the month will be the full number of days in the month except Sundays and legal holidays, being New Year’s Day, Decoration Day, July Fourth, Labor Day, Thanksgiving Day, Christmas and regular state and national election days.

“Average rate per day, Company account.” The rate is obtained by dividing the total number of days worked company account into the total amount of Pay-roll Company account, including proportion of District Office Pay-roll.

“Average rate per day, Contract account.” This rate is obtained by dividing the total number of days worked Contract account into the total amount of Pay-roll Contract account. This Contract account should be divided into three divisions, Miners, Trammers, and Others.

“Average rate per day all labor.” This rate is obtained by dividing the total number of days worked into the total amount of Pay-roll including proportion of District Office Pay-roll.

"Average rate per month." This rate is obtained by dividing the total amount of Pay-roll by the average number of men working full time. The result can be checked very closely by multiplying the average rate per day all labor, by the number of days worked full time by each man during the month.

"Production During the Month." This figure is taken from form 150.

"Tons per man per day." This figure is obtained by dividing the production for the month by the total number of days worked, including proportion of District Pay-roll.

NOTE.—In all cases the figures shown as Pay-roll Statistics should be the same as figures shown on Labor Statement, as should the average figures on the cost sheet for rate per day, etc., be the same as shown on Pay-roll Statistics.

For our outside explorations, one form may be used except where we are working some large important property that may soon develop into a mine. In such cases as the latter use a separate form for each.

RECEIPTS AND DISBURSEMENTS

7 Receipts.—No receipts of the following nature should be treated as any part of mining costs, but transferred to the General Office as receipts or income if received at mine office.

Interest on Investments.

Interest on Bills Receivable and Accounts.

Rentals received from detached property, such as lots, miners, dwellings or machinery.

Special general receipts.

Cash Discount on purchases.

Disbursements.—No disbursements of the following nature should be treated as part of mining costs, but should be transferred to the General Office if originating at the mines.

Interest on Bonded or Mortgage debt.

Interests on Loans and Bills Payable.

Interest and Discount.

Taxes.

General, Administrative and Selling expense.

NOTE.—In the General Office, all items above mentioned are Profit and Loss items, and will be shown on general balance sheet under that heading, in addition showing on General Office Cost Sheet as memo.

PRODUCTION AND SHIPMENTS

Daily.—A daily report will be sent to the General Office showing the Number of Men Employed (classified), Tons of Ore Produced, Shipments

from Mines and Docks, and Changes in Stockpile, also analysis as requested.

This report must show the estimated production and shipments each day, the overrun and shortages taken up each day, as fast as actual weights are received. Notation to be made on adjusted daily report for month, in footnote, showing difference between shipments, as shown on this report and form 150. The difference is always caused by cars in transit.

Monthly.—This report must show the actual amount of ore produced during the month, which should be based on actual shipments from pockets (actual R. R. weights) plus estimated pocket shipments in transit at end of the month, plus estimated tonnage stocked during the month, less estimated ore in transit (from pockets) at end of previous month, as follows:

January Production	Tons
Actual R. R. weights.....	
Estimated ore in transit.....	
Estimated ore stocked.....	_____
Production for January.....	
February Production	Tons
Actual R. R. weights returned.....	
Estimated ore in transit.....	
Estimated ore stocked.....	_____
Less estimated ore in transit previous month...	_____
Production for February.....	

Any overrun in cleaning up stockpile should be treated as production for season only, on cost sheet.

On this report it will be shown in column, "Stockpile overrun month," during the month in which overrun develops, being footed with "Current month" and "Previous month" and working total since January 1.

On succeeding months since January 1, becomes "Previous months" this leaving blank "Stockpile Overrun Month" except for overrun which may develop in that month. In other words, "Stockpile Overrun Month" will show only the overrun developing during the current month. This form should be made up showing the following:

Each mine by grades separately, making total of each mine and grade, total of each group of mines, each total and grand total proving itself as follows.

"Current months plus previous months and stockpile overrun month

(in current month as above), should equal total since January 1, plus on hand January 1, should equal "Total Produced and in Stock," less "Total Mine Shipments" should equal "Balance in Stock." Overrun Stockpile for season is a memo. and proves with nothing except your stockpile ledger. It should show at all times the accumulative overruns and shortage for the season. (Shortage showing in red ink.) The Dock Statement should show the amount in docks January 1, plus seasons accumulative shipments to docks, making total, and less accumulative shipments from docks, leaving balance in docks, which should check with R. R. company's dock report. Tonnage shown in this report should be the same in Mine Cost Sheets in order to agree with General Office Cost Sheet made from these figures.

Shipments.—As shown on form 150 should be actual shipments as shown by the R. R. company on their statements for the month. No other figures for shipments should go on the report. They should agree with the Royalty Statement furnished. "Balance in Stock" at the end of each month should be the difference between "Total Produced and in Stock" for the season, less shipments for the season. This should be checked with the Stockpile Ledger, the difference between this report and the Stockpile Ledger being the amount in transit.

Form 150 is intended for the auditor's office only. Shipments by vessel should show bill of lading and railway weight. This report should also show, as stated above, the ore lost in transit and the all-rail shipments. The total of this report should be checked by deducting 1 per cent. of the railroad weights to see that it approximates out the total of the amount as shown by the vessel weights. If there is a large difference, the weights should be checked over to see if there has been a mistake made.

Overruns and Shortages.—As weights reported each day would be based on estimates, it will be necessary to correct such estimates at the earliest opportunity.

Reports from railroads during shipping season of actual weights should be received within two days from date of shipment. Any difference between estimates and actual weights should be added or subtracted, as the case may be, to the estimates for the next day on Production, Dock account, Shipment from mines, and Stockpile, if affected.

When stockpiling ore the greatest care should be taken in making estimate of production, and a record must be kept of each stockpile separately, charging the pile with the estimated ore put into it, and crediting it with the actual shipments made from it. As each stockpile is cleaned up the overrun or shortage which develops on the pile must go on form 150, and on cost sheets in the seasons column, for the month in which the stockpile is cleaned up, and the overrun or shortage. A large

overrun or shortage, if thrown into the monthly cost, would make it out of proportion with other months.

Largely underestimating or overestimating amounts of ore which go into stockpiles, so that a large percentage of overrun or shortage is developed, will be considered a reflection on the watchfulness of the superintendent. In case we should develop a shortage, and it is hard to say just how much leeway should be allowed, and what percentage of overrun would be right. In any event it should not exceed 5 per cent., and if it could be brought to one-half that per cent. the cost for each month through the year would be on a better basis, and would be more nearly correct. If an overrun develops on a certain pile, it must be shown as overrun on that pile. The same if a shortage develops. In no case must the overrun from one pile be used to cover shortage in another pile, or any part of it be taken to increase the current month's production. Neither must any part of the production during the month at any time be used to cover up any shortage which may develop on any stockpile. In all cases the production and shipments, overruns and shortages must be correctly shown.

Transfer of Supplies, Labor Charges, Etc.—All transfers of mining supplies, shop labor, etc., must be reported to the General Office on form 115-6, Figs. 13 and 14, as the case may be, sending original invoice only to the receiving mine, who will take same up in the supply account in the same month in which it is rendered without regard to receipt of goods or correctness of billing. If goods do not arrive as invoiced or invoice is not correctly rendered, such corrections or shortages will be reinvoiced to the shipping mine in the succeeding month. Any controversy as to prices or adjustments will be referred to the auditor for settlement.

It will not be necessary to send copies of such invoices to the General Office unless a controversy arises, but will be sufficient for the shipping mine to show same against each mine on their distribution vouchers and the receiving mine to enter same on record of supplies purchased.

Transfer of Plant.—All transfers of plant property, such as buildings, machinery, etc., should be reported to the General Office on triplicate invoices without values sending the original and duplicate invoices to the receiving mine, who will approve and report same in the usual manner.

Values of plant transfers will be fixed by the mechanical engineer, and entries made on the general books only to cover such transfers. Memo. entries should be made on the mine books of all transfers, both from and to other mines, and at the end of the month a statement made of the shipments and receipts during that month to the General Office.

This statement to cover merely the plant transferred and to what mine it was shipped or from what mine it was received.

No machinery or supplies will be loaned to another mine, but proper transfer made of all equipment or plant transferred, except in case of machinery rental, such as steam shovels, diamond drills, etc. No machinery should be carried in plant account that is located at another mine or exploration but proper transfer made to such mine or exploration on the general books.

As a general proposition, machinery transferred to another mine is worth no more to the receiving mine on account of such transfer, therefore no expense should be added to the value of such plant by reason of such transfer. Hereafter the shipping mine will stand the expense of dismantling property loading and placing F. O. B. cars, the machinery or property transferred, charging such expenses to mine Profit and Loss.

The receiving mine will stand all expenses from this point, such as freight, unloading and handling charges, and installation, charging same to Improvements. If, however, in connection with installing this plant there is any large improvement intended, which will materially increase the value of the plant transferred, it should be taken up with the General Office and a special ruling made in such cases.

The shipping mine shall word their invoices giving description, etc., of all machinery shipped, using the exact words and numbers as shown on inventory of Dec. 31 last, and the receiving mine shall enter on their inventory the exact description as shown on the invoice.

***I* Machinery Rentals.**—This is a matter that should be discouraged as much as possible. In case of steam shovels when some of the mines would have use for their shovels only a small part of the year, and other mines have at times idle shovels, also in case of diamond drill outfits, when they desire to use them only temporarily, it becomes necessary to take care of these items in the way of a rental from one mine to another. This rental should be handled practically on the basis of cost. In other words, a greater rental should not be charged for the use of the steam shovel or diamond drill outfit than the necessary wear and tear on machinery, and the cost of putting the machinery into its original condition. All income from machinery rental should be transferred to the General Office, therefore it would be proper that any expense of the proprietor mine to whose plant the machinery is charged, to charge against this machinery rental, the cost of any repairs necessary to put the machine back into its original condition when it left the mine.

It might be well to state further that the plant account of the various mines belongs to the company as a whole, that they are given to one mine without charge for the purpose of getting out ore, and such mines taking up in the cost of operating only the necessary charges of keeping

such plant in repair. Therefore it is not a good accounting proposition for the General Office to charge a profit on the machinery used at another mine in order to take up a corresponding loss on the same transaction.

The same would also apply to Tenement rentals, the income occurring therefrom being transferred to the General Office. Therefore repairs necessary on such tenements, and the insurance necessary to keep them protected should be charged against the same account. There should not, however, be a loss to the General Office on the income account, and should any loss develop, at the end of the year it will be taken out of the Rental account and transferred to Misc. Profit and Loss of the mine owning the buildings or machinery.

MINE ACCOUNTS—MINE BOOKS (UNDERGROUND MINES)

General ledger Controlling accounts	Sub-accounts	Distributing accounts
General Office	101. Explosives	A. Steam production
	102. Candles	
	103. Oils	B. Electric power
	104. Drill steel	
Inventory	105. Lumber	C. Shop { Machine shop
	106. Mining timber	expense { Carpenter shop
	107. Tools	Smith shop
Bank	108. Steam packing and waste	D. Compressor and drills
	109. Pipe and fittings	
	110. Steam and water hose	E. Teaming
	111. Air drill hose	
	112. Steel rails	F. Repairs
Supplies.....	113. Iron Castings	
	114. Power drill castings	G. Laboratory
	115. Wire rope	
	116. Carbons	
	117. Manilla rope	
Petty Cash	118. Chemicals	
	119. Fuel	
	120. Forage	
	121. Electric supplies	
Loss and Gain	122. Bolts, nuts and washers	
	123. Car and locomotive parts	
	124. Steam shovel parts	
Taxes	125. Stationery and printing	
	126. Misc.	

MINE ACCOUNTS—MINE BOOKS (UNDERGROUND MINES)

General ledger Controlling accounts	Sub-accounts	Distributing accounts
Insurance	<div> <div>200. Development in rock</div> <div>201. Development in ore</div> <div>202. Stopping</div> <div>203. Timbering</div> <div>204. Picking and storing rock</div> <div>205. Trammig by hand</div> <div>206. Trammig by power</div> <div>207. Cage and skip tenders</div> <div>208. Pumping</div> <div>209. U. G. tracks</div> <div>210. Mining captains</div> <div>211. Shift bosses and timekeepers</div> <div>212. Dry and change houses</div> <div>213. Mine exploration</div> <div>214. General U. G. expense</div> <div>215. Rock filling</div> <div>216. Steam shovel</div> </div>	
Rents		
District Expense	<div> <div>206. Trammig by power</div> <div>207. Cage and skip tenders</div> <div>208. Pumping</div> <div>209. U. G. tracks</div> <div>210. Mining captains</div> <div>211. Shift bosses and timekeepers</div> <div>212. Dry and change houses</div> <div>213. Mine exploration</div> <div>214. General U. G. expense</div> <div>215. Rock filling</div> <div>216. Steam shovel</div> </div>	
Mining Expense.....		
Surface	<div> <div>225. Hoisting</div> <div>226. Stocking and sorting ore</div> <div>227. Shipping ore from pockets</div> <div>228. Loading stockpile, steam shovel</div> <div>229. Loading stockpile hand</div> <div>230. Stripping</div> <div>231. R. R. tracks</div> <div>232. Breaking and crushing ore</div> <div>233. Surveying and chemistry</div> <div>234. Office expense</div> <div>235. Warehouse</div> <div>236. Contributions</div> <div>237. Personal injuries</div> <div>238. General surface</div> <div>239. Misc.</div> <div>240. Grading highways</div> </div>	
Expense.....		
New Construc- tion	<div> <div>A separate account for each build- ing and equipment of each plant.</div> <div>See details on page 10.</div> </div>	
Improvements		
Accounts Receivable	<div> <div>A separate account with each job.</div> <div>See details, page 12.</div> </div>	



ADMINISTRATIVE EXPENSES

Taxes.

Interest and discount.

General expense.

Improvements.

Total cost of ore.

NOTE.—Cost of production is calculated on mine product. Royalty is calculated on shipments from mine. Transportation is calculated on shipments from docks to Lake Erie.

Administrative Expenses charged to Profit and Loss account, shown as a memo. only.

DISTRIBUTING ACCOUNTS

A. Steam Production.—Labor and supplies, including firemen, coal passers, fuel, water supply for boilers, oils and light, repairs to building, boilers, boiler insurance, etc. Intended to cover all cost of producing steam for whole plant.

The full cost of producing steam for the month will be apportioned against Hoisting, Pumping, Shops, Compressor and Drills, Electric Plant, Dry and Change house, and Heating in the proper proportion, as shown by the indicator of steam used for each, excepting when the steam from one or an entire battery of boilers is used exclusively for one power, where it will be charged against that power. In the absence of proper indicators to show amount of steam used for each, it must be arrived at by careful tests.

B. Electric Power.—Labor and supplies, including proportion of engineer's time, all supplies used in connection therewith, repairs to machinery and buildings, as well as proportion of steam used to run dynamo.

ENGINEER'S LOGS

Daily Log.—The daily log is to be made out for each plant; such information as is called for will be filled in by the engineer in charge. When a plant consists of more than a Hoist and Boilers; that is, it may also comprise a compressor, pumping engine, and electric engine, the engineer in charge of the compressor will furnish all information called for, form 101, Fig. 5.

Monthly Log.—The totals and averages of the daily logs for the month will be taken and entered on the "Monthly Summary of Engineer's Logs" under the proper plant heading; this summary provides for all plants operated, form 102, Fig. 6.

ENGINEER'S LOG

THE CLEVELAND-CLIFFS IRON CO., ISPHEMING, MICHIGAN.
 (Day begins at 7 A.M.) DATE Day 191

TIME	PRESSURE		FUEL WATER TEMPERATURE	COAL		REFRIG		WATER METER	HOMING ENGINE		PUMPING ENGINE		COMPRESSORS		ELECTRIC ENGINE	REMARKS
	BOILER	AIR		GAZE	WEIGHT	BAROMETER	WRIGHT		VACUUM	SLIPS	ROCK	REVOLUT.	NO. 1	NO. 2			VOLTS	AMPS
7 A.M.																
8 "																
1 A.M.																
8 "																
to																
7 A.M.																
Total																
Average																

SPECIAL RECORD.										OIL STATEMENT.										DAY.		NIGHT.									
Boilers Working No.		Boilers Idle No.		Boilers Closed No.		Condition of Boilers		Repairs on Boilers		Kind		Quantity		Kind		Quantity		Brinkman A		Brinkman B			Other		1st Freeman		2nd Freeman		Hajzer		Signature of Engineer
										PACKING.																					
Kind		Weight		White		Oil		Total		Kind		Weight		White		Oil		Total		Kind		Weight		White		Oil		Total		Kind	
Repairs on Engines		Repairs on Engines		Repairs on Engines		Repairs on Engines		Repairs on Engines		Repairs on Engines		Repairs on Engines		Repairs on Engines		Repairs on Engines		Repairs on Engines		Repairs on Engines		Repairs on Engines		Repairs on Engines		Repairs on Engines		Repairs on Engines		Repairs on Engines	
										MISCELLANEOUS SUPPLIES.																					
REMARKS																															

FIG. 5.—Form 101.

The full cost of electricity, carbons, etc., to be apportioned against the various accounts for which it is used in the proportion of electricity consumed by them. Electric lights to be charged against the account benefited, such as Office, Hoisting, Steam plant, etc.

C. Shop Expense.—Labor only, except as herein-after mentioned. All labor at Machine, Smith and Carpenter shops and Master Mechanic's time will be charged to shop expense, a close record being kept of time expended for and against the various accounts in the distribution of shop expense at the end of the month.

All the material used in the shops for the various operating accounts must be reported to the storekeeper daily, who will charge them direct from stores, except general items, such as Steam, Electricity, Coal, Borax, etc, which will be apportioned against the various accounts, pro-rated on a basis of labor performed.

D. Compressor and Air Drills.—Labor and supplies, including proportion of engineer's time used in running compressor, repairs to machinery and buildings, oils, waste, etc., pipe lines and repairs to same, hose and pipe for replacement, proportion of steam consumed, or other power used.

The full cost of running compressor for the month will be apportioned against the various accounts for which it is used, such as Pumping, Development in Rock or Ore, Stoping, etc., on a basis of labor performed at drilling under the above heads, and when for outside purposes, such as Pumping, or Hoisting, a proportion based on steam cost for same work, plus an extra charge on account of an increased cost of air over steam.

E. Teaming.—To this account should be charged the cost of stables, teams, teamsters, etc., for the month (except the cost of keeping mules for tramping purposes underground, which is chargeable to accounts 200-1-6). A close record must be kept during the month of work done for the different cost accounts and the same subdivided on an equitable basis against the various accounts for which the work was done.

F. Repairs.—All repairs are chargeable direct to cost accounts affected, such as repairs to skips, to cars, to Hoisting, etc., but for the purpose of showing on General Office Cost Sheet the amount expended for repairs and maintenance, all repairs must be separated on vouchers of supplies and labor from operating when sent to the General Office.

G. Laboratory.—To this account should be charged all supplies used or labor performed during the month in making analysis, in fact all cost in connection with running the laboratory.

The full cost of analysis made during the month should be ascertained from the number of analysis made, and that rate used in charging out to operation, or other mines or parties, to balance the account except as noted below.

NOTE.—All operating accounts including shop expense, laboratory, teaming, etc., should be handled on a cost basis and only the cost of such work charged to operation, or any of our other mines. In the case of work done for outsiders, a profit (to be determined by the management) should be added to this cost and such profit transferred to the General Office as a credit to Mine Profit and Loss.

MINING EXPENSE ACCOUNTS—UNDERGROUND MINES

200. Development in Rock.—Labor and supplies, including cost of miners, drillers, loading tram cars, and material used in drifting and cross-cutting, sinking or raising in rock, as well as its proportion of Compressor and Air Drill cost as shown consumed for that purpose.

201. Development In Ore.—Labor and supplies, including cost of miners, drillers, loading tram cars, and material used in driving main drifts raises or winzes in ore, as well as its proportion of Compressor and Air Drill cost as shown consumed for that purpose.

NOTE.—The above account not to include the cost of sinking or raising shafts, which will be charged to Sinking Shafts, and be treated in the General Office as deferred charges to be closed by depreciation.

Show the Number of Feet on Labor Statement of Drifting, Cross-cutting, Sinking or Raising shafts, Raises, Winzes, in ore and in rock separately.

202. Stopping.—Labor and supplies, including cost of mining, drilling, blasting and breaking down the ore body (except as per account 201) as well as wheeling ore to chutes and all shoveling in connection with same, and its proportion of Compressor and Air Drill cost as shown consumed for the purpose.

NOTE.—Stopping to include all mining on sub-levels except main raises and winzes from main levels.

203. Timbering.—Labor and supplies, including cost of all timbering in main openings, raises, and stopping work, as well as proportion of the miners labor on timbering to be charged to this account, and extraordinary repairs to shafts; ordinary repairs to shafts must be charged to Hoisting expense.

204. Picking and Storing Rock.—Labor and supplies, including all cost of picking and storing rock underground.

205. Trammig by Hand.—Labor and supplies, including all cost of trammig, shoveling, and taking ore from chutes on main levels or such sub-levels as cannot be reached by main level openings.

206. Trammig by Power.—Labor and power, including all cost of trammig, shoveling, and taking ore from chutes or main levels or such sub-levels as cannot be reached by main level openings, cost of keeping

live stock, mule drivers and when used, the proportion of electricity used for that purpose.

207. Cage and Skip Tenders.—Labor only, including checkers and bell ringers.

208. Pumping.—Labor and supplies, including pumpmen, pipemen, repairs and proportion of steam production used for pumping.

209. U. G. Tracks.—Labor and supplies and repairs on U. G. tracks, except original cost of steel rails (new) to be charged to New Construction; when used for replacement to be charged to this account.

210. Mining Captains.—Labor only.

211. Shift Bosses and Timekeepers.—Labor only.

212. Dry and Change Houses.—Labor and supplies, including all cost of running change houses, as well as steam used for heating purposes, repairs to building, etc.

213. Mine Exploration.—Labor and supplies including prospecting and diamond drilling.

214. General U. G. Expense.—Labor and supplies, including cost of ditches and other misc. items for which no provisions are made in above accounts.

215. Rock Filling.—Labor and supplies, including all cost of loading rock on surface by hand or steam shovel, tramping or switching it to the shaft, lowering it into the mine, tramping and storing it underground. This applies only to rock taken into the mine from surface and does not cover any expense of picking and storing rock underground.

216. Steam Shovel.—(Stoping in Pits.) Labor and supplies, including all cost of loading ore by steam shovel in open pits.

E SURFACE EXPENSE ACCOUNTS—UNDERGROUND MINES

225. Hoisting Expense.—Labor and supplies, including engineers (except proportion charged to electric plant, shops, compressors, etc.), as well as all oils, waste, light, brakemen and helpers, proportion of steam power, or electricity used for hoisting, repairs to skips, shafts, replacements of hoisting ropes, and ordinary repairs to shaft house.

226. Stocking and Sorting Ore.—Labor and supplies, including landing, dumping and tramping ore and rock on stockpile and preparation of stockpile bottoms and trestles.

227. Shipping Ore From Pockets.—Labor and supplies, including cost of tramping rock on surface during shipping season.

228. Loading Stockpile, Steam Shovel.—Labor and supplies, shipping stockpile, including cost of operating steam shovel, crew's wages, etc.

229. Loading Stockpile by Hand.—Labor and supplies, including cost of shipping stockpile when loaded by hand.

230. Stripping.—Labor and supplies, including drilling and blasting of surface, teams hauling dirt and all expense in connection with stripping open pit operations.

231. Railroad Tracks.—Labor and supplies, including cost of constructing surface railways, switches, etc., of broad gauge pattern, as well as all repairs to same, except new rails.

232. Breaking and Crushing Ore.—Labor and supplies, including all cost of reducing lump ore to required size, by hand or power.

233. Surveying and Chemistry.—Including all cost of engineering department, running laboratory, chemicals, etc. (except work done for outside parties or our other mines having no laboratory or engineer of its own).

234. Office Expense.—Labor and supplies, including all cost of running the office at the mines, as classified in General and District Expense.

235. Warehouse.—Labor and supplies, including salary of storekeeper and whatever supplies are consumed during the month to operate same.

236. Contributions.—Labor and supplies, to include contributions of whatever nature made at the mine, as authorized by the General Office.

237. Personal Injuries.—Including donations or whatever voluntary contributions, judgments or forced settlements, salaries and fees of surgeons and attendants, including hospital expenses, medical supplies, etc. Intended to cover all expenses of the mine on account of personal injuries.

238. General Surface Expense.—Labor and supplies, including surface items not otherwise provided for.

239. Miscellaneous.

240. Grading Highways.—Labor and supplies, including all cost of grading public roads, crossing caving territory, ordinary expense of surfacing and grading mine roads is chargeable to account No. 238.

NOTE.—Above cost accounts represent the division of operating expense at the mines and from which the mine cost sheet is made.

Taxes and Insurance will show as a separate item below these on the cost sheet, and will be transferred to the General Office by journal voucher.

The cost of operating for the month is transferred to the General Office, by journal voucher of labor and supplies, and will be the total as shown by the Mine Cost Sheet for Operating Expense. Copy of Mine Cost Sheet must be sent to the General Office as soon as completed.

MINE ACCOUNTS—MINE BOOKS (OPEN PIT MINES)

General ledger Controlling accounts	Sub-accounts	Distributing accounts
General Office	101. Explosives 102. Candles 103. Oils 104. Drill steel 105. Lumber	A. Steam production B. Electric power C. Compressor and air drills
Inventory	106. Mining timber 107. Tools 108. Steam packing and waste 109. Pipe and fittings 110. Steam and water hose repairs	D. Shop expense { Machine shop Smith shop Carpenter shop
Bank	111. Air drill hose 112. Steel rails 113. Iron castings	E. Teaming F. Repairs
Supplies.....	114. Power drill castings 115. Wire rope 116. Carbons 117. Manilla rope	G. Laboratory
Petty Cash	118. Chemicals 119. Fuel 120. Forage 121. Electric supplies	
Loss and Gain	122. Bolts, nuts and washers 123. Car and locomotive parts 124. Steam shovel parts	
Taxes	125. Stationery and printing 126. Misc.	
Insurance	250. Stripping by hand 251. Teaming 252. Mining captains 253. Shift bosses and timekeepers 254. Water supply	
Rents	255. Lighting 256. Drilling and blasting 257. Track expense	
District	258. Waste pile expense 259. Operating locomotives 260. Repairs to locomotives and cars	
Expense...	261. Operating steam shovels 262. Repairs to steam shovels 263. Office expense	
Winter	264. Warehouse 265. General stripping expense 266. Contract stripping	
Expense		
Stripping and Development..		

MINE ACCOUNTS—MINE BOOKS (OPEN PIT MINES)—*Concluded*

General ledger Controlling accounts	Sub-accounts	Distributing accounts
Mining Expense.....	{ 275. Mining by hand 276. Teaming 277. Mining captains 278. Shift bosses and timekeepers 279. Water supply 280. Lighting 281. Drilling and blasting 282. Track expense 283. Pumping 284. Operating locomotives 285. Repairs to locomotives 286. Operating steam shovels 287. Repairs to steam shovels 288. General repairs 289. General mining expense 290. Surveying and chemistry 291. Office expense 292. Warehouse 293. Contributions 294. Personal injuries 295. Removing rock in ore body 296. Stockpile expense	
New Construc- tions	{ A separate account for each build- ing and the equipment of each plant. See details page 10.	
Improvements Accounts Receivable	{ A separate account for each job. See details page 12.	

MINING EXPENSE ACCOUNTS—OPEN PIT MINES

Winter Expense.—All expenses in connection with open pit mines from the close of navigation to the opening of navigation next year will be charged to Winter Expense.

Such expense will be taken care of in eight monthly amounts by charge to operations of one-eighth of the total amount each month from April to November inclusive. The expense accruing during the

winter will be separated according to the cost sheet and extra items prorated against regular costs in equal monthly amounts.

NOTE.—The above charges apply to mining expense only. The Stripping and Development charges will be handled in the usual manner, by charging the expenditures monthly to Stripping and Development.

STRIPPING AND DEVELOPMENT

250. Stripping by Hand.—Labor and supplies, including wheelers, shovelers, and supplies used in stripping by hand.

251. Teaming.—Labor and supplies, including all costs of teams and labor while at stripping, or work in connection with stripping.

252. Mining Captains.—Labor only, to be divided on a basis of locomotive and steam shovel labor on stripping or in ore, latter to be charged to mining account No. 277.

253. Shift Bosses and Timekeepers.—Labor only, on same subdivision as account No. 277.

254. Water Supply.—Labor and supplies, including cost of pumping plant, pipe lines, and pipemen and water carriers, for water supply of locomotives and steam shovels while on stripping.

255. Lighting.—Labor and supplies, including proportionate cost of dynamo, where electric lights are used, divided on same basis as No. 252.

256. Drilling and Blasting.—Labor and supplies, including drilling, powder gang and explosives while on stripping.

257. Track Expense.—Labor and supplies, including track men, rails, spikes and ties (except cost of permanent track in new mine, to be charged to New Construction), all repairs to permanent or temporary tracks to be charged to No. 257. Tracks in ore to be charged to No. 282.

258. Waste Pile Expense.—Labor and supplies, including trackmen on waste pile trimmers and cost of keeping track in repair on waste pile.

259. Operating Locomotives.—Labor and supplies, including fuel, engineer and firemen, brakemen, and signal men and all cost of running waste trains (except water supply).

260. Repairs Locomotive and Cars.—Labor and supplies, including full cost of repairs on cars, and proportionate cost of repairs on locomotives, as between stripping and ore.

261. Operating Steam Shovels.—Labor and supplies, including engineers, firemen and cranesmen, while on stripping.

262. Repairs. Steam Shovels.—Labor and supplies, while on stripping.

263. Office Expense.—Labor and supplies, including all cost of running the office of the mine, as classified in General and Direct Expense.

264. Warehouse.—Labor and supplies, including salary of store-

keeper and whatever supplies are consumed during the month to operate same.

265. General Stripping Expense.—Labor and supplies, including all surveying and other expenses not otherwise provided for than stripping.

266. Contract Stripping.—Including all cost of stripping paid outsiders on account of contracts.

MINING EXPENSE

275. Mining by Hand.—Labor and supplies, including wheelers, shovelers and miners as well as material used in mining by hand.

276. Teaming.—Labor and supplies, when working in ore or in connection with mines working in ore.

277. Mining Captains.—Labor only, to be divided on basis of locomotives and steam shovels, labor on stripping or in ore. Stripping proportion to be charged to account No. 252.

278. Shift Bosses and Timekeepers.—Labor only, on some division as account No. 277.

279. Water Supply.—Including cost of pumping plant, pipe lines and pipe men and water carriers for water supply of locomotives and steam shovels, while working in ore.

280. Lighting.—Labor and supplies, including proportionate cost of dynamo where electric lighting is used when working in ore.

281. Drilling and Blasting.—Labor and supplies, including drillers, powder gang and explosives while working in ore.

282. Track Expense.—Labor and supplies, including track men, rails spikes, and ties (except cost of permanent track in new mine to be charged to new construction). All repairs to permanent or temporary tracks to be charged to account No. 282 when laid and used for working in ore. Stripping tracks to be charged to account No. 257.

283. Pumping.—Labor and supplies, including all cost of pumping, when pumping is necessary in wet mines, except as used for accounts 254 and 279.

284. Operating Locomotives.—Labor and supplies, including fuel, engineers and firemen, brakemen and signal men, when working in ore.

285. Repairs to Locomotives.—Labor and supplies on locomotives when working in ore.

286. Operating Steam Shovels.—Labor and supplies, including engineers, firemen and cranesmen when working in ore.

287. Repairs to Steam Shovels.—Labor and supplies, when working in ore.

288. General Repairs.—Labor and supplies, including all repairs to building and machinery not otherwise provided for.

289. General Mining Expense.—Labor and supplies, including car checkers, billers and other expenses not otherwise provided for.

290. Surveying and Chemistry.—Including all cost of engineering department, running laboratory, chemicals, etc. (except work done for outside parties or our other mines, having no laboratory or engineer of their own).

291. Office Expense.—Labor and supplies, including all cost of running the office at the mines, as classified in General and Direct Expense.

292. Warehouse.—Labor and supplies, including salary of supply clerk and whatever supplies are consumed during the month to operate same.

293. Contributions.—Labor and supplies, to include contributions of whatever nature made at the mines as authorized by the General Office.

294. Personal Injuries.—Including donations, or voluntary contributions, judgments, or forced settlements, salaries and fees of surgeons and attendants, including hospital expense, medical supplies, etc. Intended to cover all expenses of the mine on account of personal injuries.

295. Removing Rock in Ore Body.—Labor and supplies, including all cost of loading and handling rock encountered in the ore body, including the cost and time of steam shovel, locomotives and hauling of such rock to waste pile.

NOTE.—No low-grade ore or lean ore to be included in this account.

296. Stockpile Expense.—Labor and supplies, including all cost of stockpile, low-grade or lean ore.

NOTE.—Only the mining expense of Missabe mines will be treated as operating expenses. The stripping cost will be transferred as a separate item in total and treated as an asset in the General Office cost until extinguished, although the cost of stripping will be shown as outlined above on the Mine Cost Sheet.

The cost of operating for the month is transferred to the General Office by journal voucher of labor and supplies and must agree with the Mine Cost Sheet.

MINE OFFICE, ACCOUNTING REPORTS, ACCOUNTS, ETC.

Invoices.—Invoices should be turned over to the supply clerk promptly, and should be checked by him against material received. If material checks out all right he should sign invoice on line designated for that purpose. The invoice should then be checked as to extensions and footings, discount and freight deductions, and should be signed as correct by chief clerk, and marked as to what account number should be charged. All invoices must be charged to mining supplies, and from these the items are taken through the supply book, and charged to the expense account benefited. When the invoices have been approved by

Journal Entries, Miscellaneous.—Journal entries should be made on "credit vouchers" covering any transactions that may come up during the month, form 90, Fig. 7. Charge "General Office" and credit "Petty Cash," decreasing your Petty Cash for example. Entry should be made charging Petty Cash and crediting sundries, covering cash collections, and charging "General Office" and crediting "Petty Cash," covering remittance of cash collections to General Office.

Entries should be made each month closing all accounts into General Office, except Supplies, Petty Cash, and Bank Account. These misc. entries follow the vouchers covering invoices in order of their dates, and the operating vouchers hereafter mentioned may follow the misc. entries. Continue the series of numbers from Office vouchers to Credit vouchers, so that there may be no duplicate numbers on any vouchers for the year. A new series of numbers may be commenced each year.

[illegible]

actions," form 91, Fig. 8. All credits to General Office will appear in General Office column. All credits to other accounts will appear in sundry column on the left. All debits to Supplies, Mining Expense, Surface Expense, Stripping and Development, Steam production, Electric power, the different shops, Teaming and Compressor and Drills will appear in columns provided for that purpose. Debits to all other

accounts will appear in sundry column on the right. The footings only of all columns except sundries will be posted to the ledger. Each item in the sundry column whether debit or credit will be posted to the ledger separately.

The Record of Transactions will be footed and the footings of columns on debit side will equal footings of columns on credit side. No explanation of journal entries will be made in the Record of Transactions, all explanations will appear on journal entry voucher only.

Ledger.—Any account that the Record of Transactions may call for must be opened in the ledger (and may be opened to advantage in the following order): General Office, Inventory, Bank, Supplies, Petty Cash, Mining Expense, Surface Expense (Stripping and Development), Steam Production, Electric Power, Machine Shop, Carpenter Shop, Blacksmith Shop, Teaming, Compressor and Air Drills, Operating Expense, Accounts Receivable, New Construction Accounts. All accounts in the ledger will be closed into General Office account at the end of each month except Bank Account, Supplies, Petty Cash. A preliminary trial balance will be taken from the ledger before closing entries are made and a final trial balance after the closing entries are made, copies of both being forwarded to the General Office.

Vouchers, Debit and Credit to Supplies.—All vouchers having a debit or credit to Supplies must be recorded in this book, it gives a detail of the Supply Account in the ledger, and shows balance of each class of supplies that should be on hand each month.

The first entry that should be made in the record is the inventory entry, crediting inventory and charging each class of supplies with amount on hand at time books are opened. All purchases are added and on credit side supplies consumed or sold are shown under proper headings. The footings of all columns should be carried forward each month so that at the end of each month the debit footings will represent total of each class of supplies on hand when account was opened, plus supplies purchased since. The credit footings will represent the total supplies distributed to date. These footings are carried forward until the end of the year when the account is started again with inventory figures. When the total footings both debit and credit are carried forward, the balance of supplies on hand each month represented by difference between debits and credits, should be shown in red ink, and total should agree with trial balance.

Each month the warehouse clerk should secure the amount on hand of some class of supplies and should take an actual inventory of that class to determine whether or not he is developing a shortage or overrun.

In this way an excessive profit or loss at the end of the year will be avoided.

[illegible]

All columns in this record should be footed each month, balanced across with total and ruled.

The balance on hand at the first of the year should be brought forward on line provided for that purpose and total production for the month added, giving total production for the season.

Digitized by Google

the railway dock statement. The total footings should be carried forward from month to month, so that at any time the ledger will show total shipments from mines to docks and total shipments from docks to lower ports.

Stockpile Ledger.—An account should be kept with each stockpile in this record, charging it up monthly with mining tally weights put into it, and crediting it with actual weights shipped from each pile. This will show actual overrun or shortage of each pile.

Time Books.—The timekeeper should assign on his time book a page or pages for each class of employees, that is Engineers should all show in the same place on time book. In another place Firemen should be found, Surface men in another, the same plan being carried out with each class of employees. The time shown under these different headings should be classified in detail on lower part of page on which the time is shown. If there is not sufficient room on that page, the classification may be shown on the following page. The timekeeper should in this classification state exactly what the men are doing, such as "digging ditch around caved ground," "unloading timber," "unloading coal," "cleaning up stockpile bottom," etc.

The number of days at each rate in the classification should agree exactly with the number of days at each rate as shown in the time being classified.

Check-roll.—The lines on the book should be numbered consecutively, from number one to the highest number held by any employee on the time book. The names of employees are written opposite their numbers in the Check-roll. The time of each employee is transferred from time book to check-roll, thus collecting it. An employee may appear on several places on the time book, but his time will appear on only one line in the check-roll.

On the Check-roll a different mark should be used to distinguish company account time from contract time. At the end of each month the number of company account days at each rate, and the number of contract days, as extended in their proper columns, thus showing the number of company account days at each rate and total contract for each employee for the month.

The total number of company account days at each rate on the Check-roll should balance with the total number of company account days at each rate in the time book. The total number of contract days on Check-roll should balance with total number of contract days in the time book.

Contract Book.—This book is provided for the purpose of figuring the earnings of each contract and of keeping a permanent record of same. The earnings of each contract employee are transferred from this

book to his account on the Pay-roll. The number of each contract should be shown on this Contract Book, and the name and number of each man working on each contract should be carried into the Contract Book, under their respective contract numbers from time books. This may be done before the end of the month in order to facilitate work at the first of each month.

The number of days worked by each man in the contract, should be placed to his credit in the contract book as soon as they can be determined on time book. The number of cars of ore or rock mined or number of feet raised, sunk or drifted by each contract with rate per car or foot, should be turned in by the Mining Captain and placed to the credit of the contract.

The Warehouse Clerk will report supplies chargeable to each contract. The net earnings of each contract will then be determined by extending cars or feet mined at the different rates and deducting from these gross earnings the supplies and labor cost chargeable to the contract. The net earnings are divided by the number of days worked in the contract to determine the rate per day and each man in the contract receives his portion of the net earnings of the contract according to the number of days he worked. The amount distributed to the men in each contract must agree exactly with the net earnings of the contract.

It is understood that when a contract has to pay its trammers or other labor, the trammers or laborers do not receive any share in the contract, but are carried and paid as company account labor, and the total of this company account labor performed for each contract is charged up to the respective contracts as a labor cost to the contract. A provision for this charge to the contract is made on "Summary" in Contract Book.

Pay-roll.—Time of each employee is transferred directly from the Check-roll to the Pay-roll, the company account column on the Pay-roll showing number of company account days worked by each man at each rate, while the contract column will show total contract days worked by each man. The contract rates need not be shown on the Pay-roll. The company account time is then extended on Pay-roll. The contract earnings of each employee are collected from contract book and placed on Pay-roll to his credit as a total. The deductions for Doctor, Aid Fund, etc., are then made and Pay-roll footed and balanced. The footings on each page are not carried forward but are summarized at the end of Pay-roll for the month.

When settlements with employees are made during the month, their account should be spread on Pay-roll, and under no condition shall a due bill or check be made in favor of an employee from any other source than Pay-roll book.

Pay-rolls should be footed, balanced and summarized before journal vouchers are made out for the month.

Labor Classification.—The classification of labor shown on the Time books, as outlined above, is copied into Labor Classification book. The company account time is extended on this book and should balance with footing of company account column in summary of Pay-roll. The contract earnings are carried into Labor Classification book from Contract book and the total contract earnings shown on labor classification should balance with contract column in summary of Pay-roll. The total of labor classification should equal gross amount of Pay-roll.

In transferring classification from Time book and Contract book, into Labor Classification book, care should be taken to get all of each class of labor under its heading. That is, have all Surface labor listed on the Labor Classification together rather than have it appear in several different places. The same applies to "Drifting in Ore," "Drifting in Rock," etc. This will greatly facilitate making journal entries from labor classification.

The Shop and Team labor is kept on Time book but is it not usually classified in Time book. The foremen of Shops and Teams make daily reports covering labor performance in their departments each day. These daily reports are entered daily in Shop labor book, which gives a much better classification of labor than could be obtained on Time book.

When all Shop and Team reports have been entered in the Shop labor book, the total number of hours on that book should agree with total number of hours shown on Labor Classification book worked by Shops and Teams. The total labor cost of each shop should be taken from each labor classification, and dividing these amounts by the number of hours worked in the respective shops, will give the rate per hour from each shop. The extensions should then be made on Shop and Team labor book. The total of these extensions for each shop should, of course, balance with the labor cost of each shop taken from the Labor Classification.

Record of Supplies Used.—This book is provided for the purpose of keeping accurate record of each class of supplies used for each class of labor performed. Several pages in the book are set apart for each of the operating, shop and Improvements accounts, and such others as may be found necessary. The following are some of the accounts which will be opened, Steam Production, Machine Shop, Blacksmith Shop, Carpenter Shop, Compressor and Air Drills, etc. (Fig. 10, Form 2).

Supplies are issued only on an order from the Superintendent or persons duly authorized by him, and each order for supplies should state for what purpose the supplies are to be used, that is exactly on what piece of work they will be used. The Warehouse Clerk will enter these

[illegible]

FIG. 10.—FORM 2.

Reports to General Office.—As soon as Pay-roll, Labor classifications and Supply summaries are completed and balanced, entries should be

made on vouchers provided by the General Office for that purpose. The first entry will be an Accounts Payable voucher (form 119, Fig. 11), covering net amounts of Pay-roll, that is amount for which checks will be drawn. This entry will show gross amount of Pay-roll, less Pay-roll collections for which no checks will be drawn, and the net amount of payment. This latter amount should show on back of voucher opposite the Mining Labor account number of the respective mines.

The second entry (form 113, Fig. 12) will cover the amount of Pay-roll collections shown on the above entry, and will be a charge to "Mining

OLIVER IRON MINING COMPANY. JOURNAL ENTRY VOUCHER.					
DEBIT MINING LABOR.			CREDIT SUNDRY ACCOUNTS. PAY ROLL COLLECTIONS FOR MONTH.		
19	<p>For Collections made on Pay Rolls at _____ Mine during month of _____ 19 _____ this amount having been deducted on Accounts Payable Voucher covering Mining Labor for same month.</p> <p>Tenement Rentals, Machinery Rentals, Cash Sales, Labor Supplies,</p>	<div style="border: 1px solid black; padding: 5px; margin: 10px auto; width: 80%;"> <p style="text-align: center;">(Reverse Side)</p> <p style="text-align: center;">OLIVER IRON MINING CO.</p> <p style="text-align: center;">JOURNAL VOUCHER OF PAY ROLL COLLECTIONS.</p> <p>Entered _____ Journal Folio _____ No. _____ _____ 19 _____ <p style="text-align: center;">BOOKKEEPER</p> </p></div>			
See Accounts Payable Voucher No. _____					
<p>Correct, _____ <div style="text-align: right;">CHIEF CLERK.</div> <p>Approved, _____ <div style="text-align: right;">AUDITOR.</div> </p> </p>			<p>The above amounts represent deductions on Pay Roll at _____ Mine during month of _____ 19 _____, and is correct for entry on General Books of OLIVER IRON MINING COMPANY.</p> <p style="text-align: right;">_____ SUPERINTENDENT.</p>		

FIG. 12.—FORM 113.

Labor," and a credit to "Rentals," "Supplies," Garnishee and Collection Fees, Cash, Sales, or such other items as may be found necessary. The charges to mining labor on Form 113-9, Figs. 11 and 12, should equal gross amount of Pay-roll and should be checked against total of Labor Classification before being forwarded.

The third entry will be a credit to Mining Labor and a charge to Direct Expense, Operating, General Repairs, Supplies, New Construction, and so on as per form 116, Fig. 13. The credit to Mining Labor on this form should equal charges to Mining Labor on the preceding forms.

The fourth entry will be a credit to Mining Supplies charge to Direct Expense, Operating, General Repairs, New Construction, etc., as per form 115, Fig. 14. This voucher should cover total of all supplies disbursed during the month with the exception of supplies collected for on Pay-roll, which will appear on form 113, Fig. 12. This voucher should be made from Summary of Supplies Used, furnished by the Warehouse Clerk.

OLIVER IRON MINING COMPANY.	
JOURNAL ENTRY VOUCHER.	
DEBIT SUNDRY ACCOUNTS.	CREDIT MINING LABOR.
<p>For Mining Labor employed for the various accounts shown below at _____ Mine,</p> <p>during month of _____ 19____</p>	
Direct Expense, Operating, General Repairs, Total Operating, Mining Supplies, New Construction, Improvements, Miscellaneous Profit and Loss, Accounts Receivable,	<div style="border: 1px solid black; padding: 10px; margin: auto; width: fit-content;"> <p style="text-align: right; margin: 0;">(Reverse Side)</p> <hr/> <p style="text-align: center; font-weight: bold; margin: 0;">OLIVER IRON MINING CO.</p> <hr/> <p style="text-align: center; margin: 0;">JOURNAL VOUCHER OF MINING LABOR.</p> <hr/> <p>Entered _____ No. _____ Journal Folio _____ 19____</p> <hr/> <p style="text-align: right; font-weight: bold; margin: 0;">BOOKKEEPER</p> </div>
Total Credit to Mining Labor,	
<p>The above is a summary of Mining Labor and for what account such Labor was performed at _____ Mine, during month of _____ 19____</p> <p>as shown by Pay Roll Record and Time Books in the Mine Office, and is correct for entry on General Books of Oliver Iron Mining Company.</p>	
_____ SUPERINTENDENT.	<p>Correct,</p> <p>Approved, _____ CHIEF CLERK.</p> <p style="text-align: right;">_____ AUDITOR.</p>

FIG. 13.—FORM 116.

The fifth entry will cover estimated Taxes and Insurance for the month as per form 114. Insurance will be separated to show amount chargeable on Mine buildings and amount chargeable to Dwellings rented or to be rented. Insurance on superintendent's residence or such dwellings as are furnished employees without rent should be charged to Mine buildings; the total Insurance on Mine buildings only will be shown on Mine Cost Sheet.

The sixth entry will be made on form 120, covering cash collections for the month. The entry will be charge Cash Sales and credit Garnishee and Collection Fees, Rentals, Accounts Receivable, etc. This entry should credit all items sold for cash except supplies which will receive credit on

form 115, Fig. 14. Where the collections are too numerous to show details on the voucher, a statement giving details should be attached to the voucher. All cash collections should be remitted to the General Office at the end of each month, with a letter stating that the cash should be credited to Cash Sales.

General.—In addition to the above vouchers there will be the monthly Ore Reports, Analysis of Direct Expense, form 127, Fig. 15, New Construction, Misc. Profit and Loss (form 202, Fig. 16), Improvements.

OLIVER IRON MINING COMPANY. JOURNAL ENTRY VOUCHER.									
DEBIT SUNDRY ACCOUNTS.					CREDIT MINING LABOR				
For Mining Supplies consumed at					Mine of this Company, during month of				
as shown in detail by the records in the Mine Office.					19				
	Direct Expense, Operating, General Repairs, Total Operating, New Construction, Improvements, Miscellaneous Profit and Loss, Accounts Receivable, Cash Sales								
		<div style="border: 1px solid black; padding: 5px; margin: auto; width: 80%;"> <p style="text-align: center; margin: 0;">(Reverse Side)</p> <p style="text-align: center; margin: 0;">OLIVER IRON MINING CO.</p> <p style="text-align: center; margin: 0;">JOURNAL VOUCHER</p> <p style="text-align: center; margin: 0;">OF</p> <p style="text-align: center; margin: 0;">MINING SUPPLIES USED.</p> <p style="margin: 0;">Entered _____ No. _____</p> <p style="margin: 0;">Journal Folio _____ 19 _____</p> <p style="text-align: right; margin: 0;">BOOKKEEPER</p> </div>							
Total Credit to Supplies,									
The above is a summary of Mining Supplies consumed at _____ Mine, during month of _____ 19 ____, as shown by Mine Supplies Used Book and Ledger, and is correct for entry on General Books of Oliver Iron Mining Company. <div style="text-align: right; margin-top: 10px;">_____ SUPERINTENDENT</div>					Correct, <div style="text-align: right; margin-top: 10px;">_____ CHIEF CLERK</div> Approved, <div style="text-align: right; margin-top: 10px;">_____ AUDITOR</div>				

FIG. 14.—FORM 115.

The General Office will also require a copy of the Mine Cost Sheet at the earliest possible date.

If there are any charges out of the ordinary on any entry coming from mines to General Office, such as charges to Idle Mines Supplies, Profit and Loss, a new exploration, etc., details should be given to enable the General Office to handle the charge promptly without writing the mine for particulars.

Vouchers—Operating (Mine Books).—As soon as General Office entries and reports are forwarded work on Mine Cost Sheet should be commenced. First make a journal entry on credit voucher charging

DIRECT, GENERAL AND OFFICE EXPENSE						
_____ MINE						
ANALYSIS FOR MONTH AND SEASON ENDING _____ 19 ____						
	ACCOUNT No.	ACCOUNT	AMOUNT	TOTAL FOR MONTH	TOTAL FOR SEASON	REMARKS
	1.	Salaries (Supt. and Office force)				
	2.	Rents				
		a. Offices				
		b. Warehouses				
		c. Real Estate and Royalty				
	3.	Stationery and Printing				
	4.	Telephone and Telegraphing				
		a. Telephone Rental				
		b. Telegraph Rental				
		c. Telegrams				
		d. Salaries (Opp. and Messengers)				
		e. Toll Service and Sundries				
	5.	Traveling Expense				
	6.	Office Expense				
		a. Postage				
		b. Petty Expenses				
		c. Lunches				
		d. Payments to Banks				
		e. Repairs				
	7.	Special Expense				
		a. Special Service				
		b. Special Expense, Officers				
		c. Premium Surety Bonds				
		d. Patents				
	8.	Legal Expense				
	9.	Analysis				
	10.	Prospecting				
	11.	Revenue Stamps				
	12.	Experimental Work				
	13.	Office Fixtures				
		a. Sundries				
		b. Repairs				
	14.	Commissions				
		Total for Month,				
		Total for Season				

FIG. 15.—FORM 127.

the sundry Mining and Surface Expenses, Accounts Receivable, etc., and crediting Pay-roll with the gross amount of Pay-roll. This entry should be made from Labor Classification book.

Second, credit on credit voucher, Steam Production and charge the different Shops, Mining and Surface expenses, effected with amount charged to Steam Production. This entry should be made from information secured from Master Mechanic, or some one fully conversant with portion of steam consumed by Pumps, Hoists, etc.

PLANT—PROFIT AND LOSS CHARGES		
<p><i>Analysis of charges at Mine during month ending 190....., to new Construction, Improvement and Miscellaneous Profit and Loss, as shown by vouchers of Supplies Consumed No. 115 and Mining Labor No. 116.</i></p>		
ACCOUNT NO.	DESCRIPTION	AMOUNT

FIG. 16.—FORM 202.

Third, credit on credit voucher, the different Shops, Mining and Surface expenses, etc., as per classification on the Shop Labor books, Steam Production charge, Labor performed by Air Drills, and Power furnished by Electric plant. This entry will balance our charges to Shops, Teaming, etc. The above entry distributes all labor performed during the month.

Fourth, make a journal entry on credit voucher, charging sundry Mining and Surface Expense accounts, etc., and crediting Supplies under the different classes, with Supplies consumed, except amount of supplies

sold and collected for on the Pay-Roll. This entry will be made from Summary of Supplies Used.

Fifth, credit on credit voucher, Steam Production, and charge the different accounts benefited with the amount of Supplies charged to Steam Production during the month. This should be done from information furnished by the Master Mechanic or some one fully conversant with portion of steam consumed by Pumps, Hoists, etc.

Sixth, credit on credit voucher the different Shops, etc., and charge Mining and Surface expenses, etc., with supplies and Steam Production used by shops, etc. This charge to sundry Mining and Surface expenses should be made in the same proportion as shops, etc., was charged to the Mining and Surface expenses. In other words, determine the percentage that the total supplies used by shops bear to total labor performed by shops. Taking this percentage of shop labor charged to each class of Mining and Surface expense, will give the charge to each class of Mining and Surface expenses for Shop supplies. These entries distribute to costs all supplies consumed on account of operations during the month. These labor and supply entries should be now entered in Record of Vouchers, charged to Mining and Surface Expenses or if the Mine is a Surface Mine, in the corresponding Surface Mine book. From this book figures for Cost Sheet can now be taken.

Cost Sheets.—The figures for labor and supplies required for Mine Cost Sheet, form 49, Fig. 17, may now be taken from the Record of Vouchers charged to Mining and Surface Expenses or Mining and Stripping and Development in case of Surface Mines.

These figures should be placed on cost sheet opposite the proper account and a total of labor and supply columns on Cost sheet should agree with total charges to Mining and Surface Expenses, on Record of Vouchers charged to Mining and Surface Expenses, with the exception of the amount of Taxes and Insurance which is shown on the cost sheet, as a memo. only.

Dividing the different amounts now shown on the cost sheet by the production will give the cost per ton for the different expense accounts.

While Taxes and Insurance are shown on the cost sheet as a memo. only, a cost per ton should be determined and shown; all costs per ton should be figured to three decimal places.

The summary of production should show amount on hand at first of each year, and total of each grade produced for the month, previous months, and season, tonnage shipped, overruns and balance in stock at end of the month.

The summary of supplies may be obtained for the month from summary reported by the Warehouse Clerk, and the total should balance with supply column, in body of the cost sheet for the month and season,

before Taxes and Insurance are added. The cost per ton is obtained by dividing the amount of different classes of supplies by the production, and the cost per ton should be figured to three decimal places. Total of labor and supply columns and amount of Taxes and Insurance and Direct Expense on Cost Sheet should be checked carefully with figures reported to General Office on monthly journal vouchers.

Labor Sheets.—Form 50, Fig. 18. The number of days and earnings of each class of employees for the statement must be secured from Labor Classification. Divide the number of days worked by actual working days in the month as shown in list furnished by the Auditor, to obtain the number of men for the month. The number of men should be figured to one decimal place. The rate per day is obtained by dividing earnings of each class of labor by the actual number of days worked by the respective classes of labor. Cost per ton is obtained by dividing earnings by production. The number of days on the labor sheet should agree with the total days shown on Pay-roll, and the total earnings should agree with gross amount of Pay-roll. The contract and company account days and earnings for lower part of the labor statement as well as the number of feet of Drifts, Shafts, Raises or Winzes, may be obtained from Labor Classification. The supplies are reported by the Warehouse Clerk and should agree with supplies on the Cost Sheet. The total hoist of ore and rock usually represents the tons trammed. The difference between the total tons of ore produced and the number of tons obtained from development work, gives the number of tons stoped. Obtain the number of men and rate per day by same method used in upper portion of the statement. Determine the cost per foot of shafts, raises or winzes and drifts, by dividing sum of earnings, company account and contract and the supplies, by the number of feet of Shafts, Raises, Winzes and Drifts. The cost per ton for Stoping and Trimming is obtained by dividing the sum of earnings of trammers and the supplies used, by number of tons stoped or trammed.

Feet and tons per man per day are obtained by dividing feet Sunk, Drifted, or Raised, etc., by the number of days worked on each, and the tons stoped or trammed by same method.

The difference between earnings on Labor Sheet and labor on Cost Sheet should be explained by supplementary statement under "Remarks Column," something as follows:

- Total Labor as per Cost Sheet
- Add Labor charged Construction
- Add Labor charged Supplies
- Add Labor charged Accounts Receivable
- Add Labor charged, etc.
- Total Labor as per Labor Statement.

CHAPTER II

MINING AND MILLING NATIVE COPPER

ACCOUNTING METHODS OF THE OJIBWAY MINING COMPANY

In the Lake Superior Copper District, copper is found in its native state, distributed through the vein rock. These copper bearing veins vary from 14 ft. to 60 ft. or more in width, and have a dip, varying from 26 degrees to 80 degrees from the horizontal.

The development of these copper deposits is usually by means of inclined shafts, which are either sunk in the vein itself, or in the footwall at distances varying from 30 ft. to 100 ft. parallel to the vein; as depth is attained drifts are run to the vein at from 100 ft. to 200 ft. apart, and when the mine is sufficiently opened up to begin production, stopes are started in the drifts at regular intervals.

The vein rock after being broken down in the stopes by air drills is sorted by hand, about 40 per cent. being discarded and used to fill worked out stopes. The good rock is loaded into cars by hand and trammed to the shaft, dumped into the skip and hoisted to the Rock House at surface. The skips dump automatically, the rock running over grizzlies; the coarse rock is crushed in Blake type crushers for shipment to the mill. The railroad tracks run directly under the rock house so that the rock can be loaded into the cars by gravity for shipment to the mill in train loads.

At the mill the trains enter directly over the storage bins and dump their loads. The rock is fed to steam stamps by gravity, and is crushed to sand; this sand passes over screens, jigs, rolls and concentrating tables. The copper is separated from the rock by gravity, with the aid of water. The resulting concentrates which run from 30 per cent. to 90

HEAD OFFICE LEDGER ACCOUNTS

per cent. copper are sent to the smelter for treatment.

Capital Stock (paid in).—To this account is credited the amount of the Capital Stock of the company (paid in). The debit for this journal entry is to "Subscription." As assessments are paid the amount of the Capital Stock account is increased by the amount of the assessment called.

Vouchers Payable.—To this account we credit the footing of the Voucher Record for the month. We debit this account with all vouchers paid, as per footing of the Cash Book for the month in question.

HEAD OFFICE LEDGER ACCOUNTS

General accounts	Sub-accounts
Capital Stock (paid in)	
Vouchers Payable	
Subscription	
Assessments	
Mining Property	
Furniture and fixtures	
Cash	
Notes Receivable	
Accounts Receivable	
Mine Agent	
Loss and Gain	
Copper (sales)	
Construction	{ Mining Expense
	{ Development
	{ Transportation
Operating Account.....	{ Stamping
	{ Surface
	{ Office
	{ Incidentals
	{ Office Expense
	{ General Expense
	{ Salaries
General Expense.....	{ Legal
	{ Postage and Stationery
	{ Smelting and Selling and Freight
	{ Interest, Discount, etc.

Subscription.—When the corporation was organized the amount of Capital stock offered for public subscription was credited to the Capital Stock account for the amount paid in, which was the subscription price; this account was charged with that amount and as the subscriptions were paid, either in cash or notes, this account is credited and closes. In the event of another issue of stock the account would be opened.

Assessments.—This account is charged with the full amount of Assessments as called, the credit being to the Capital Stock Account (increasing the paid up value). As assessments are paid the Assessment Account will receive credit for the amounts until all are paid when the account closes. A separate account is kept with each assessment.

Mining Property.—To this account is charged the original cost of the mining property, also the cost of additional lands that may be purchased from time to time.

Furniture and Fixtures.—To this account is charged all office furniture and fixtures, typewriters, adding and calculating machines, etc.

Cash Account.—This account shows the receipts and disbursements of cash each month as per cash book.

Notes Receivable.—To this account is charged the face value of all notes received in exchange for Stock, Cash, Copper or property. As the notes are taken up this account will receive credit.

Accounts Receivable.—This account shows the amount due the company from the sale of copper, property, etc. Separate accounts are kept with each corporation or individual.

Mine Agent.—To this account is charged all funds furnished the Mine Agent to carry on operations at the property. The account receives credit each month for the following charges, as per report furnished by the Mine Agent.

Construction.....	Dr. Construction Account
Mining Expense.....	} Dr. Operating Expenses
Development.....	
Transportation.....	
Stamping.....	
Surface Expense.....	
Office Expense.....	
Incidentals.....	

The difference between the debits and credits of this account is represented by:

Cash	Supplies
Fuel	Accounts Receivable
Less Accounts Payable	

The above as shown by trial balance of mine books.

Loss and Gain.—The following accounts are closed into this account each month by journal entry.

Copper	Operating Expense
Construction	General Expense

Copper.—This account is credited with all sales of copper.

Construction.—This account is charged with all construction items as per Mine Agent's report each month. Credit Mine Agent.

Operating Expense.—This account is charged with all operating expenses each month as per Mine Agent's report. This account comprises the following accounts:

Mining Expense	Surface Expense
Development	Office Expense
Transportation	Incidental Expense
Stamping	Credit Mine Agent

General Expense.—This account is composed of the following sub-accounts:

Office Expense.—Rent, heat, light, janitor, etc.

Postage and Stationery.—Stamps, stationery, printed matter, and misc. office supplies.

Legal Expenses.—

Salaries.—Corporation officers, general manager, office clerks.

General.—Directors' fees, traveling expenses, corporation expenses, telegrams and subscriptions.

Smelting and Selling.—

Interest and Discount.—

All salaries and invoices are paid by check; the voucher system is used, a voucher being made out and the amounts entered in the Voucher Record to the proper account.

In the Annual Report furnished to stockholders a financial statement appears, of which the following is an example.

FINANCIAL STATEMENT

TRIAL BALANCE APRIL 30, 1910

Capital Stock (paid in).....	\$924,000.00	
Vouchers Payable.....	10,247.13	
Mining Property.....	\$459,919.29	
Accounts Receivable.....	18,406.81	
Cash.....	44,330.18	
Supplies.....	15,320.26	
Loss and Gain.....	396,270.59	
	<hr/>	
	934,247.13	934,247.13

CURRENT ASSETS AND LIABILITIES

Assets

Accounts Receivable.....	18,406.81
Cash.....	44,330.18
Supplies.....	15,320.26
	<hr/>
	78,057.25

Liabilities

Vouchers Payable.....	10,247.13
	<hr/>
Assets in excess of liabilities.....	\$67,810.12

RECEIPTS AND EXPENDITURES

Receipts

Cash on hand May 1, 1909.....		38,437.58
Calls paid.....	66,744.00	
Interest.....	2,370.54	
Bills Receivable.....	64,230.00	
	<hr/>	
		133,344.54
		<hr/>
		171,782.12

Expenditures

Mining Property.....	24,000.00
Operating Expenses.....	93,749.82
Construction.....	9,501.86
Office, General, Legal, Salaries..	5,401.60
	<hr/>
	132,653.28

Less

Increase in Vouchers Payable...	3,714.88
Decrease in Supplies.....	1,356.93
Decrease in Accounts Receivable.....	129.53
	<hr/>
	5,201.34
	<hr/>
	127,451.94

Cash on hand April 30, 1910..... \$44,330.18

MINE ACCOUNTS—MINE BOOKS

General Ledger Controlling Accounts	SIDE LEDGER		
	Sub-accounts	Closed Accounts	Shop Accounts
1. General Expenditures	A separate account for each Building	0-10. Steam Plant	0-1. Teaming
	Equipmt. of each plant	0-12. Elect. Lt. and Power	0-2. Carpenters
	Water lines	0-13. Compressor	0-3. Machinists
	Sewer lines	0-14. Power Drills	0-4. Blacksmiths
2. Construction	Air lines—Surface	0-15. Air lines	0-5. Electricians
	Electric lines	0-16. Tramming	0-6. Eng. Dept.
	Dams	0-17. U. G. Tracks	0-7. Masons
	Railroad	0-18. U. G. Cars	
	Trestles	0-19. Pumping	
	Port. Machy. and Equipmt.	0-20. Timbering	
		0-21. Gen. U. G. Expense	(Stamp Mill)
	A separate account for Sinking each Shaft	0-22. Hoisting	0-55. Surface
	Construction ditto	0-23. Rockhouse	0-56. Teaming
	Plats each shaft	0-24. Water Supply	0-57. Carpenters
3. Development.	Each Cross-cut	0-25. Heating System	0-58. Machinists
	Each Raise	0-26. Co. Team a/c	0-59. Blacksmiths
	Each Winze	0-27. Clearing Land	0-60. Electricians
	Each Drift	0-29. Highways	0-61. Masons
	Diamond Drilling		
	Surface Exploring		
4. Mining Expense.....	A separate account for each stope		
5. Transportation		(Stamp Mill)	
6. Stamping	6-1. Head No. 1	0-40. Steam Plant	
	6-2. Head No. 2	0-41. Pumping	
7. Surface Expense		0-42. El. Lt. and Power	
8. Office Expense.....	8-1. Purchase Office	0-43. Rolls	
	8-2. Mine Office	0-44. Regrinding	
9. Incidentals		0-45. Screens and Elevators	
10. Cash		0-46. Jigs	
11. Treasurer		0-47. Tables and Vanners	
12. Bills Audited		0-48. Conveyor	
13. Sundry Labor		0-49. Laboratory	
14. Taxes		0-50. Wash Account	
15. Insurance		0-51. General Expense	
16. Aid Fund		0-52. Rents	

MINE ACCOUNTS—MINE BOOKS—*Concluded*

General Ledger Controlling Accounts	SIDE LEDGER		
	Sub-accounts	Closed Accounts	Shop Accounts
17. Supplies.....	17-1. General 17-2. Iron and Steel 17-3. Explosives 17-4. Cement, etc. 17-5. Lumber, etc. 17-6. Machinery 17-7. Pipe and Fitts. 17-8. Oils and Grease 17-9. Electric 17-10. Tools 17-11. Mill		
18. Fuel.....	18-1. Soft Coal 18-2. Hard Coal 18-3. Bloss Coal 18-4. Coke 18-5. Family Wood 18-6. Boiler Wood 18-7. Mill		
19. Accounts Receivable			
20. Deferred Accounts.....	20-1. Loss and Gain on Supplies, Adjustment 20-2. Manufacturing Supplies 20-3. Hoisting Ropes		

GENERAL LEDGER ACCOUNTS

1. General Expenditures.—The following general ledger accounts are closed into this account each month by journal entry.

- | | |
|-------------------|--------------------|
| 3. Development | 7. Surface Expense |
| 4. Mining Expense | 8. Office Expense |
| 5. Transportation | 9. Incidentals |
| 6. Stamping | |

2. Construction.—This account comprises all Construction sub-accounts in the side ledger. The construction schedule calls for a separate account for each Building.

- | | |
|--------------------------|-----------------------------------------|
| B. Equipt. of each plant | F. Dams |
| C. Water lines | G. Railroads |
| D. Sewer lines | H. Coal trestles |
| E. Air lines on surface | I. Portable machinery and equipt., etc. |

See construction side ledger accounts for details.

3. Development.—This account comprises all Development sub-accounts in the side ledger. The Development schedule calls for separate accounts as follows:

- | | |
|--------------------------------------------------------------------|------------------------|
| A. Sinking each shaft | E. Each raise |
| B. Construction of each shaft
(Timbering, tracks, piping, etc.) | F. Each winze |
| C. Plats, each shaft | G. Each drift |
| D. Each crosscut | H. Diamond drilling |
| | I. Surface exploration |

See side ledger accounts for details.

4. Mining Expense.—This account comprises all Stoping accounts in the side ledger. A separate account is kept with each stope.

5. Transportation.—To this account will be charged the following items:

Ojibway Mining Company					
DAILY REPORT OF COOK SHIPMENTS					
Remarks of Mill Superintendent:	FROM SLAFT	CAR No.	TO BIN	Date of Shipment.....	Signature of Train Conductor
				..19	
	Total Cars	Total Tons....			

This blank must be filled out in duplicate, signed by train conductor at the Mine, by the millman at the MILL and a copy forwarded promptly at the Company's office at the MHS.

FIG. 19.—FORM 25.

- Freight on rock to stamp mill
 Freight on mass copper to smelter
 Freight on mineral to smelter
 Labor loading rock cars
 Labor loading mass copper
 Repairs to mineral cars

The Surface foreman will superintend the loading of Rock cars, and as Rock trains are made up for shipment to the mill he will make out a list in duplicate, on form 25, Fig. 19, showing the car numbers and the shaft they come from, also date and time of day noted. The train conductor will sign this report in duplicate; the original goes to the Mine Clerk; the duplicate will be delivered to the Mill Superintendent or some one authorized by him to receive it. In the event of a car being set out of the train for any reason between the mine and the mill, the conductor will note same on the report; this enables the mine and mill to keep accurate track of shipments.

These train reports are tabulated in a book, ruled for the purpose, form 23, Fig. 20, segregating the shipments from each shaft each day. Car numbers only will be shown. Each car is rated at 41 tons capacity.

ROCK SHIPMENTS										Month of _____ 19....	
Date	1	2	3	4	5	6	7	8	etc.	Total	Tons
Shaft No.1											
Total											
Shaft No. 2											
Total											
Total Cars											

FIG. 20.—FORM 23.

This will give a complete record of shipments to the Mill. The Rock shipped Train Reports are the basis on which settlement is made with the railroad for freight charges.

Mass copper is shipped in car loads to the smelter direct from the mine. If a track scale is convenient the empty car will be weighed before and after loading, if not the mass will be weighed on a portable

scale as loaded. This will be done under the supervision of the Surface foreman who will report weight of car to the Mine Clerk. Mass shipments are entered in the "Mineral and Mass Shipments" record as mentioned below.

Mineral is shipped from the mill to the smelter in special steel hopper cars. For the convenience of the smelter, grades 1, 2, 3, 4 will be shipped together and Headings and Barrel work together. A report covering each car of Mineral shipped is made out in triplicate, in the following form, form 34, Fig. 21. Copy to the Smelter, Mine Clerk and one retained at Mill.

REPORT OF MINERAL SHIPPED			
		Date.....	
Gentlemen:			
Car No. containing mineral as stated below was shipped			
to your works on the above date.			
No. Barrels	Grade	Net Mine Weight	
	Total as per last report		
	H. Stamps		
	No. 1 "		
	" 2 "		
	" 3 "		
	" 4 "		
	Barrel Work		
	Mass Copper		
	Total		
Yours truly,			
			Mill Supt.

FIG. 21.—FORM 34.

These reports of mineral shipped will be entered in the record of "Mineral and Mass Copper Shipped," form 29, Fig. 22. For this purpose a book ruled as per the following illustration will best serve the purpose.

6. Stamping.—This account comprises the sub-accounts in the side ledger with each Stamp Head.

MINERAL AND MASS COPPER SHIPPED TO THE SMELTER.....1911										
Date	Car		Mass.	Hds.	Brl. Wk.	1	2	3	4	Total
	Initials	Number								
1										
2										
3										
<hr/>										
30										
31										
Totals										

FIG. 22.—FORM 29.

7. Surface Expense.—Charge to this account:

All Surface labor as per time book
Supplies as per supply book

} Closed off each month on a basis of labor performed to the various accounts benefited.

Water supply, proportion
Elect. light and power, proportion
Highways
Clearing land
Fire protection
Rents, balance for the month

} These items constitute Surface Expense together with any charges which may come from the Surface account.

8. Office Expense.—This account comprises the following sub-accounts in the side ledger.

- 8-1. Purchasing Office
- 8-2. Mine Office

9. Incidentals.—To this account will be charged such items as follows:

Taxes
Insurance
Traveling Expense

Periodicals—Subscriptions
Telegrams
Misc. items

10. Cash Account.—This account is kept in the usual way, showing cash Receipts, Disbursements and balance on hand as per details shown in the cash book.

11. Treasurer's Account.—All funds received from the Treasurer will be placed to the credit of this account. In the event of the mine office making any expenditure on account of the purchase of any land, or any expenses in connection with the purchase of land, the expenditure so

made will be charged to this account. A full explanation of the transaction will be made on the voucher covering such expenditure.

12. Bills Audited.—This account will be credited with the footing of the Voucher Record for the month (Journal entry).

Debit this account with the footings of the "Audited Vouchers Paid" columns in the Cash Book. Posted from the Cash Book each month.

13. Sundry Labor.—Credit this account with the total Gross Earnings of labor as per time books. Labor as per time books for the month is spread on the Cost Sheet (Fig. 84) for distribution to the various accounts. The total of this sheet is the gross earnings for the month and will be placed to the credit of this account by journal entry.

Debit this account with the total footings of the "Sundry Labor" paid columns in the Cash Book, posted each month from the Cash Book in total. Also debit this account with all deductions from the Pay-roll which are credited to other ledger accounts or do not require a check to be drawn in settlement. This will be done by journal entry.

14. Taxes.—The total amount of taxes payable in each calendar year should be anticipated and will be pro-rated one-twelfth each month, chargeable to Incidentals and credited to this account.

When tax statements are paid at the end of the year they will be charged to this account. If the amount of taxes for the year as shown by the statement are not what was anticipated an adjustment of the difference will be made and spread over the remaining months in the fiscal year in equal amounts.

15. Insurance.—The total amount of Insurance premiums payable during the year will be anticipated and will be pro-rated one-twelfth each month, chargeable to Incidentals and a credit to this account.

When Insurance premiums are paid they will be charged to this account. In the event of additional Insurance being taken out during the year, or any changes in the schedule which changes the amount of premiums payable during the year, an adjustment will be necessary to conform to the new conditions. This adjustment made, the balance of the account will be pro-rated equally into the remaining months of the fiscal year.

In order to carry the proper amount of insurance on the various buildings and plant equipment, detailed schedule of the cost of each building and the equipment of each plant will be made up as called for by Construction Schedules. From these detailed costs such items as excavation and foundations, etc., will be eliminated and the amount of repairs, also the depreciation of each building and plant equipment will be considered in arriving at the Insurable value of each piece of property.

Copies of the detailed schedules on which Insurance is based will be kept on file at the general office for quick reference in the event of fire.

Any amount received from the Insurance companies to cover loss and damage by fire, will be placed to the credit of the various accounts sustaining loss, according to the amounts allowed in the settlement schedule.

An Insurance map should be kept on file, showing the location, size, and insurable value of each building and plant equipment also all water lines and hydrants, electric and telephone lines. This map should be revised each year.

16. Aid Fund.—Collections on account of the aid fund are made through the Pay-roll. Payments are generally made through the Pay-roll. Collections and payments for this account are made according to the rules of the Aid Fund which follow:

AID FUND RULES

For the purpose of providing an aid fund to cover cases of death or injury by accident, the company agrees with its employees that the following rules shall be observed:

1. Employees whose names appear on the company's books shall be entitled to the benefits of the Aid Fund as hereinafter provided.

2. No person shall be considered as entitled to compensation from the aid fund, until he shall have become a member of it, by having worked at least three days for the company and paid one month's dues into the Treasury.

3. Members' contributions shall be considered as paid at the expiration of said three days, and shall be retained in the mine office until disposed of as hereinafter provided, the agent of the mine or his appointee being treasurer of the Aid Fund. The monthly dues shall be 50 cents.

4. There shall be a committee of five to manage the affairs of the Aid Fund to consist of the following: Head mining captain, Head mine physician, an officer of the company (to be selected by the company), also one miner and one surface man, to be selected by the first three annually.

Members applying for aid must in all cases obtain a certificate from the mine physician and deliver it or cause it to be delivered, to some member of the committee, who shall present it at the next committee meeting. The committee shall have power to accept or reject claims.

No money shall be drawn from the treasury except on the signature of the mine physician and of the member of the committee, representing the department of the mine in which said applicant is employed.

Regular committee meetings shall be held on the first Saturday of each month, at the Head mining captain's office. Special meetings shall be called by the chairman of the said committee, and shall be called by

him at the request in writing of three members of said committee. The committee shall have power to select members to fill vacancies.

5. Members disabled by accident occurring while actually engaged in work or labor for the company, shall recover one dollar for each working day lost thereby, provided that six days shall have been lost as a result of said accident. When a watchman is necessary to watch with the disabled, the committee shall hire a man, and pay him out of the fund, a sum equal to his daily wages for the time he shall have watched.

6. A member injured as above, and at the end of six months permanently disabled by said injury, may be discharged from the Aid Fund on receipt of \$200.00. If only partially disabled he may receive such compensation as the committee may determine.

7. A member disabled as a result of a disability or accident that occurred before his employment by the company is not entitled to the benefits of the Aid Fund.

8. During the period of his disablement as a result of injury, any contributor shall be exempt from the payment of dues.

Any contributor capable of performing an ordinary day's work shall not be considered as disabled.

9. Injuries received by a contributor while engaged in any act, business or employment, other than that assigned them by the company, will not be considered as coming within the provisions of the Rule 5, but injuries received by underground men in going down and coming up from the mine will be considered as entitling them to aid under the rules.

10. When a contributor dies from accidental injuries received while actually engaged in work or labor for the company, there shall be paid from the Aid Fund \$200.00 less funeral expenses (not to exceed \$100.00) when they are incurred or authorized by the committee. It is provided that in all cases of death, the payment shall be made exclusively to the relative, relations, or heir at law, of the deceased in the following order, First to the Widow, Second to the Children, Third to the Parents, Fourth to the Brothers and Sisters if shown to be dependent on the labor of the deceased.

Said payments shall be made in such amounts and at such times as the committee may determine, and when so paid all obligations on the part of the Aid Fund for account of such contributor shall cease.

11. The above amounts shall be paid in lieu of all stated monthly compensation, and when paid all obligations on the part of the Aid Fund for account of such contributor shall cease.

In no case shall the money to be paid as above be applicable to the debts of the deceased or liable to be attached by his creditors of said beneficiaries.

12. No death or disability from sickness will be aided.

In all cases of death, satisfactory evidence will be required that the death resulted from an accidental injury as aforesaid, and not from disease.

13. In case the committee named in Rule 4 shall decide that any one has obtained assistance from the Aid Fund by deceit, he shall be deprived of the benefit of the Aid Fund during such time as said committee shall specify in written notice to him and during the same time he shall be exempt from the monthly charge for dues.

14. The Mine Physician shall keep a record of all cases of accident and he is required to use all possible care and diligence to make his record accurate and complete. In order that such a record may be kept, it shall be the duty of every person who desires or expects to receive aid, to give notice to the mine physician at once, on the occurrence of his disability, and likewise to give notice of the time of resuming work.

To avoid mistakes in names applicants for aid must bring their office pay book or docket, that their names may be entered correctly.

15. All points of dispute shall be decided by the committee and their decision shall be final in all cases.

The mine physician's record will in all cases govern the committee in making the estimates for aid and allowance for compensation.

16. Should a contributor, after giving notice to the mine physician, desire the services of another physician, it is not meant that the above rules shall debar him from that privilege, but the date of his inability and the period of its continuance, must be made known to the committee through the certificate of the mine physician, before favorable action by the committee can be expected. Certificates from other parties will not govern in the disposition of such cases, and to secure favorable action said contributor shall report progress from time to time to the mine physician and be examined by him.

17. When any contributor shall be discharged from the services of the company, or shall voluntarily cease to be an employee of said company he shall have no further claims upon said fund, nor rights to the benefits thereof.

MEDICAL ATTENDANCE

The following rules have been adopted for application to cases where the services of the mine physician may be requested.

1. Every employee of the company by paying the doctor fee as charged against him on the books of the company is entitled to medical attendance (including medicines) in all cases deemed necessary by the

mine physician both for himself and the ordinary members of his family that live under his roof and are dependent on him for support.

2. All children of employees between the ages of 16 and 19 years, if in the employ of the company or earning wages elsewhere and living on the mine location, must have paid the usual doctor fee in order to be entitled to medical attendance.

3. When a child of an employee between 16 and 19 years of age has worked for the company and been charged his fee he is entitled to medical attendance for the balance of the month. If he ceases to work for the company, except on account of disability, or works elsewhere for wages, he cannot after the expiration of the last month for which he has paid the regular fee, claim medical attendance for a member of his father's family. If, however, he shall have ceased to work for the company because of physical disability, he then is entitled to medical attendance equally with any other member of the family. Should said physical disability, however, be the result of injury or disease incurred or contracted during employment away from the mine, he is not entitled to free medical attendance.

4. A married daughter of an employee, not a widow who lives with her father, is not entitled to medical attendance, unless she shall have paid the regular fee in advance.

5. Visitors are not entitled to free medical attendance, employees having visitors that require medical attendance are ultimately responsible for the cost thereof.

6. When an employee of the company quits the latter's service after the tenth day of the month, and leaves his family at the mine, his family is entitled to medical attendance for the balance of that month.

In the protracted absence of the husband, the wife may pay the usual fee in advance and be entitled to medical attendance for himself and family.

7. Contractors living on the mine and generally any person or persons living on the mine not otherwise entitled to medical attendance, under the rules, may be admitted to the benefits of medical attendance for themselves and families, on payment of the usual fee in advance, and giving notice to the clerk of the company of their intention to do so.

8. Employees injured or diseased in consequence of being immoral, intoxicated or disorderly will be charged extra for medical attendance. Such accounts will be collected through the company office, unless promptly adjusted by the party to whom such attendance is rendered.

9. No claim to receive medical attendance will be granted unless good faith be shown by the claimant.

10. All cases not falling under any of the above rules will be passed upon by the company.

17. Supplies.—This account comprises the following sub-accounts in the side ledger:

17-1. General Supplies	17- 7. Pipe and Fitts.
17-2. Iron and Steel	17- 8. Oils and Grease
17-3. Explosives	17- 9. Electric
17-4. Cement	17-10. Tools
17-5. Lumber and Timber	17-11. Stamp Mill
17-6. Machinery	

18. Fuel.—This account comprises the following sub-accounts in the side ledger:

18-1. Soft Coal	18-5. Family Wood
18-2. Hard Coal	18-6. Boiler Wood
18-3. Blossburg Coal	18-7. Stamp Mill
18-4. Coke	

19. Accounts Receivable.—This heading is used to cover whatever accounts are necessary with individuals or corporations owing the company for services performed or supplies furnished.

20. Deferred Accounts.—This account comprises the following sub-accounts in the side ledger:

20-1. Loss and Gain on Supplies, Adjustment
20-2. Manufacturing Supplies
20-3. Hoisting Ropes

SIDE-LEDGER ACCOUNTS—SHOP ACCOUNTS

0-1. Teaming.—Charge this account with expense of

Hired teams as per time book
Co. Team Account.

This account is closed out each month on a basis of labor performed, to the various accounts benefited.

0-2. Carpenters.—Charge this account with:

Carpenters labor as per time book
Supplies as per supply book
Elect. Lt. and Power proportion
Heating System proportion
Repairs to Shop and Equipt.

This account is closed out each month on a basis of labor performed, to the various accounts benefited.

0-3. Machinists.—Charge this account with:

Machinists labor as per time book
Supplies as per supply book
Elect. Lt. and Power proportion
Heating System proportion
Repairs to shop and Equipt.

This account is closed out each month on a basis of labor performed, to the various accounts benefited.

0-4. Blacksmiths.—Charge this account with:

Blacksmith labor as per time book
Supplies as per supply book
Fuel as per supply book
Elect. Lt. and Power proportion
Heating System proportion
Repairs to Shop and Equipt.

This account is closed out each month on a basis of labor performed, to the various accounts benefited.

0-5. Electricians.—Charge this account with:

Electricians labor as per time book
Supplies as per supply book.

This account is closed out each month on a basis of labor performed, to the various accounts benefited.

0-6. Engineering Dept.—Charge this account with:

Engineers and assistants labor as per time book
Supplies as per supply book
Fuel as per supply book
Electric Lt. and Power proportion
Janitor service.

This account is closed out each month on a basis of labor performed, to the various accounts benefited.

0-7. Masons.—Charge this account with:

Mason labor as per time book
Supplies as per supply book.

This account is closed out each month on a basis of labor performed, to the various accounts benefited.

Stamp Mill Shop Accounts are similar to the Mine Shop Accounts and are handled in the same way.

SIDE-LEDGER ACCOUNTS—CLOSED ACCOUNTS

0-10. Steam Plant.—Charge this account with:

Firemens labor as per time book	Water supply proportion
Coal wheelers as per time book	Elect. Lt. and Power proportion
Supplies as per supply book	Repairs to Building and Equipt.
Fuel as per supply book	

This account is closed out each month on a basis of H. P. used, to the various accounts benefited.

Reports.—A monthly report (form 40, Fig. 23), is made out by the Master Mechanic in duplicate from daily reports, Fig. 24.

STEAM PLANT REPORT					Month of.....	
Date	Coal	Ashes	Water	Steam Pressure	Feed Water Temp.	
1						
2						
3						
<hr/>						
30						
31						
Total						

Pounds Coal per horse power per hour
 Gallons Water evaporated per pound Coal
 Gallons Water evaporated per pound Combustible

Master Mechanic

FIG. 23.—FORM 40.

The original copy of the monthly report will go to the Superintendent, the duplicate copy to the Mine clerk. The weight of coal consumed must check with the amount charged to Steam Plant account on the supply book. Gallons of Water used must check with quantity charged to Steam Plant from the distribution of Water Supply account. Coal should be weighed as used, and ashes as removed from the pit. Feed water used can be measured with a Hot Water Meter on the feed water line.

0-12. Electric Light and Power.—Charge this account with:

Engineers time as per time book
 Steam Plant proportion
 Heating System proportion
 Supplies as per supply book
 Repairs to Generating Plant
 Repairs to Transmission Lines

This account is closed out each month, to the various accounts benefited, on a basis of current used.

Three separate circuits are used, Power, Arc, and Incandescent lights. As a basis for figuring the distribution of current consumed by incandescent lights, we use a 16 candle-power lamp burning one hour. Power is distributed as per readings of meters at each consuming point.

Reports.—The Master Mechanic makes out a monthly report (form 42, Fig. 25) in duplicate, covering the operation of the generating plant. This report is made up from daily reports, form 42-A, Fig. 26.

OJIBWAY MINING CO.						
Electric Power Plant Report.						
Generator No. _____				Date _____ 19__		
Av. Volt Meter Reading _____		Av. Ammeter Reading _____		Power K. W. H. _____		
Av. Steam Pressure _____ lbs.		Av. Receiver Pressure _____ lbs.		Light K. W. H. _____		
		Av. Vacuum _____ in.		Total K. W. H. _____		
Remarks: _____						
Engineer Day Shift			Engineer Night Shift			
Started up _____		Started up _____		Street lights on _____		
Shut down _____		Shut down _____		Street lights off _____		
HOURLY READINGS						Recording Wattmeter Readings
TIME	VOLT METER	AMMETER	STEAM	RECEIVER	VACUUM	POWER
						Begin Day _____
						End Day _____
						Begin Day _____
						End Day _____
						Total _____
						LIGHT
						Begin Day _____
						End Day _____
						POWER
						Begin Night _____
						End Night _____
						Begin Night _____
						End Night _____
						Total _____
						LIGHT
						Begin Night _____
						End Night _____

FIG. 26.—FORM 42-A.

The original copy of this report goes to the Superintendent and the duplicate to the Mine Clerk.

0-13. Compressor.—Charge this account with:

Engineers time as per time book
 Supplies as per Supply book
 Steam Plant proportion
 Electric Lt. and Power proportion
 Water Supply proportion
 Heating System proportion
 All repairs to building and plant

This account is closed out each month to the various underground openings on a basis of drill shifts worked. One compressor is steam driven, and one by motor.

Reports.—The Master Mechanic makes out a monthly report (form 41, Fig. 27) in duplicate for each compressor, from daily reports, form 41-A, Fig. 28.

COMPRESSOR REPORT.		Month of _____			
Date	Revolutions	Cu. Ft. Free Air	Air Pressure	Steam Pressure	Temperature Free Air
1					
2					
3					
<hr/>					
30					
31					
Total					
<hr/>					
_____ Master Mechanic					

FIG. 27.—FORM 41.

When air is used for pumping or other work, the pumps, etc., will be rated at so many drill shifts by the Master Mechanic so that the whole account is distributed on a basis of drill shifts worked.

0-14. Power Drills.—Charge this account with cost of:

Sharpening Drills
 New Drills
 Hauling Drills to and from Shafts
 Repairing Drill machines, posts and Tripods.

This account is closed out each month. The cost of sharpening and

DISTRIBUTION OF POWER DRILLS. Month.....

	1	2	3	4	5	6	7	8	9	10		30	31	Total
Drill No. 1-Shaft 1-Level 2-N.	2	2	2	2	2	2	2							14
Drill No. 1-Shaft 1-Level 2-S.								2	2	2				8
Shop												x	x	
Drill No. 2-Shaft 2-Level 7-S.	2	2	2	1										7
Shop				x	x	x	x	x	x	x		x	x	
Drill No. 3-Shaft 2-Level 5-N.	2	2	2	1						x	x			7
Drill No. 3-Shaft 2-Level 6-N.				1	2	2	2	2	2	2		2	2	19

FIG. 29.—FORM 30.

From this report we get "Total Drill Shifts for the month."

"Total Drill Shifts for each opening."

"Total Drill Shifts for each machine."

A "Power Drill Record," form 43, Fig. 30, is kept for each machine by the Mine Clerk, showing the repairs on each machine in detail, each month, also shifts worked each month. This record covers a period of 12 months. The information for this record is taken from the "Distribution of Power Drills" and Record of Supplies Used.

POWER DRILL RECORD													
Cost.....		Type Rand R-3.....				Machine Number 4.....							
	Jan.	Feb.	Mar.	Apr.					Totals				
Shifts Worked	47	50	42	45					184				
Chucks	1	5.00							1	5.00			
Side Rods	2	.60							2	.60			
Ratchets			1	.75					1	.75			
Pawls													
Pawl Springs		2	.50						2	.50			
Chuck Bolts			1	.70					1	.70			
Chuck Bolt Nuts			2	.10					2	.10			
Feed Screws		1	1.50						1	1.50			
Handles					1	.90			1	.90			
Cylinders					1	5.00			1	5.00			
Air Chests					1	2.00			1	2.00			
Valves					1	1.75			1	1.75			
Machinist Labor	1.10	.75				2.00				3.75			
Smith Labor						2.00				2.00			
Totals	6.60	3.50	.80	13.65						24.55			
Cost Per Shift	.14	.07	.02	.30						.13			

FIG. 30.—FORM 43.

to the shafts, in the case of drifts and cross-cuts the figures will have to be changed from day to day as the work advances. The average advance in feet can be added for each shift worked as shown by the Power Drill Record. Cost per ton trammed 100 ft. is arrived at by dividing the cost by the number of tons, this result will then be divided by the number of hundred feet trammed. Distance is figured for one direction only.

The cars of good and poor rock as shown by these reports must check with the Hoisting Report turned in by the hoisting engineer. The time and wages shown must check with the time and wages as shown by the time book, charged to Trammings account.

"Monthly Record of Trammimg," form 36-B, Fig. 33, this record is

[illegible]

FIG. 32.—FORM 36-A.

made out from the Shift Boss's reports. The day and night shifts are shown separately on the record. This form is shown on the following page and explains itself.

"Rock Trammed Report."—Form 36-C, Fig. 34.—This record is made up from the Shift Boss's reports, and shows for each opening worked during the month, the cars of good and poor rock, both day and night shift, also cost per ton 100 ft. This record is used both as a comparative record and to furnish information required for the cost sheet.

0-17. U. G. Tracks.—Charge this account with all labor and supplies to lay or change underground tracks. In making charges to this account the particular opening in which the work is done must be specified.

This account is closed out each month to the various openings (accounts) on a basis of cost of work done.

0-18. U. G. Cars.—Charge to this account all labor and supplies to repair tram cars. In making charges to this account the cost of repairing

MONTHLY RECORD OF TRAMMING.

Tons Rock per car, Distance foot X cars

Month of _____ to No. _____
Daily Sheets No. _____ to No. _____

Day	UNDERGROUND		NET TOTAL CARS TRAMMED		Total	Total Trammed	Hours Trammed	Labor	Supplies	Total Cost	Cost per Ton	Disc. Held	Disc. per Day
	Day	Night	Good	Waste									
1													
2													
3													
4													
5													
29													
30													
31													
Cars													
Total													

Fig. 33.—Form 36-B.

ROCK TRAMMED

Shaft No. _____

Month of _____ to No. _____
Daily Sheets _____ to _____

Date	Day	Night	Good		Waste		Total		Total Trammed	Hours Trammed	Labor	Supplies	Total Cost	Cost per Ton	Disc. Held	Disc. per Day
			Good	Waste	Good	Waste										
1																
2																
3																
4																
29																
30																
31																
Cars																
Total																

Fig. 34.—Form 36-C.

each car will be kept separate and the opening the car was last used in will be specified.

This account will be closed out each month to the various openings (accounts) benefited on a basis of cost of work done.

0-19. Pumping.—Charge this account with:

- Pumpman's time as per time book
- Supplies as per supply book
- Compressor proportion
- Elect. Lt. and Power, proportion
- Repairs to Pumps and Pipe lines
- Repairs to Motors and transmission lines.

Separate account is kept with pumping in each shaft.

This account is closed off each month to the various openings worked during the month on a basis of tons of rock broken.

NOTE.—The cost of pumping in No. 1 shaft will be charged to the openings tributary to No. 1 shaft; the same applies to No. 2 shaft. The Master Mechanic will report to the Mine Clerk each month the quantity of water pumped from each shaft.

0-20. Timbering.—Charge this account with all labor and supplies used in timbering the mine openings. In making charges to this account it is necessary that the particular opening where the work is being done should be specified.

This account is closed off each month to the various openings benefited on a basis of cost of work done.

0-21. General Underground Expense.—Charge this account with:

- Captains' time
- Shift Bosses' time
- Change house men
- Waller
- Selectors
- Sprinkler
- Sharpening Tools
- U. G. Surveying
- Hauling explosives and tools to shafts
- Shaft Repairs
- All cost of operating and maintaining change house
- All cost of operating and maintaining captains office.

This account is closed out each month to the various openings active during the month, on a basis of tons of rock broken.

0-22. Hoisting.—Charge to this account:

- Engineer's time as per time book
- Surface Landers as per time book
- Supplies used as per supply book
- Steam Plant proportion

Elect. Lt. and Power proportion
 Heating System proportion
 Hoisting ropes proportion
 Repairs to Pulley stands and skips
 Repairs to building and plant.

This account is charged off each month to the various active underground openings on a basis of tons of rock hoisted from the openings.

Reports.—A "Daily Hoisting Record" (form 16, Fig. 35) is made out each shift for each shaft by the hoisting engineer; the original copy

OJIBWAY COPPER COMPANY Ojibway, Mich.						
Hoisting Record _____ Shaft _____						
For the _____ Shift				Date _____ 19 ____		
LEVEL NUMBERS	SKIPS COPPER ROCK	SKIPS POOR ROCK	TOTAL SKIPS	SKIPS MEN	SKIPS TIMBER SUPPLIES	REMARKS
1						
2						
3						
15						
TOTAL						
						Engineer.

FIG. 35.—FORM 16.

ROCK HOISTED.																				
OJIBWAY MINING COMPANY, \															Shaft _____		Shift _____		Month of _____	
LEVEL	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Poor Rock	Total Hoist	R. H. Discard		
Date 1																				
2																				
3																				
4																				
5																				
6																				
7																				
8																				
9																				
31																				
Total																				

FIG. 36.—FORM 20-A.

goes to the mine clerk, the duplicate to the captain. Rock hoisted figures on these reports must check with those shown on the trammer bosses' reports.

The Rope Travel is figured from this record.

A "Rock Hoisted," form 20-A, Fig. 36, monthly record is kept, separate sheets being kept for each shift. This information comes from the daily Hoisting Record.

SUMMARY OF ROCK HOISTED																		
OJIBWAY MINING COMPANY.																		
Month of _____																		
LEVEL	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Poor Rock	Total Hoisted	R. H. Discard
Shaft No. 1 Day																		
Night																		
Total																		
Shaft No. 2 Day																		
Night																		
Total																		
Shaft No. 3 Day																		
Night																		
Total																		
Shaft No. 4 Day																		
Night																		
Total																		
Hoisted this year																		
No. 1 Shaft																		
No. 2 Shaft																		
No. 3 Shaft																		
No. 4 Shaft																		
Total																		

FIG. 37.—FORM 20-B.

SUMMARY OF HOISTING RECORD.									
Ojibway Mining Company									
Month of _____									
		SHAFT NO. 1		SHAFT NO. 2		SHAFT NO. 3		TOTAL	
		Ships	Tons	Ships	Tons	Ships	Tons	Ships	Tons
All Rock	Day								
	Night								
Total Rock, Month									
Total Rock, Year									
Poor Rock,	Day								
	Night								
	R. H.								
Total Poor Rock, Month									
Total Poor Rock, Year									
Stamp Rock, Month									
Stamp Rock, Year									
Rock Shipped, Month									
Rock Shipped, Year									
Per Oad, Poor Rock, Month									
Per Oad, Poor Rock, Year									
Average Load Per Skip									

FIG. 38.—FORM 20-C.

These sheets give a detailed record of the rock coming from each level during the month from each shaft, and for both day and night shift.

These sheets will be kept up to date by the Mine Clerk.

A "Summary of Rock Hoisted," form 20-B, Fig. 37, record is made out each month by the mine clerk. This record is a summary of the "Rock Hoisted" monthly records. It is self-explanatory.

A "Summary of Hoisting Records," form 20-C, Fig. 38, is made up by the Mine Clerk. This record is different from the Summary of Rock Hoisted in all particulars although most of the information required comes from them. The Stamp rock is the difference between the total hoist and the poor rock discarded. The amount of rock shipped comes from the Rock Shipped record. The average load per skip is arrived at by dividing the tons of rock shipped by the number of skips of good rock hoisted. We assume that the rock bins are full at the first and the last of each month.

0-23. Rock House.—This account is charged with:

- Rock House labor as per time book
- Supplies used as per supply book
- Elect. Lt. and Power proportion
- Repairs to building and equipt.

This account is closed out each month to the various openings underground on a basis of tons of rock hoisted from each opening.

0-24. Water Supply.—Charge this account with:

- Pumpmen's time as per time book
- Supplies as per supply book
- Steam Plant proportion
- Electric Lt. and Power proportion
- Repairs to building and Equipt.
- Repairs to pipe lines and hydrants.

This account is closed out each month to the various accounts benefited on a basis of water used. Water furnished to company dwellings, boarding house, and barn will be charged to Surface Expense. The Master Mechanic will report to the Mine Clerk each month the quantity of water pumped.

0-25. Heating System.—Charge this account with:

- Steam plant proportion
- Supplies used as per supply book
- Repairs to Vacuum pump, pipe lines and radiators.

This account is closed out each month to the various accounts benefited on a basis of square feet of radiation in the various buildings heated.

0-26. Company Team Account.—Charge this account with company teamsters as per time book:

Supplies and Forage as per Supply book
Repairs to Barn, Wagons, Sleighs, Harness
Veterinary services.

This account is closed into Teaming each month.

0-27. Clearing Land.—Charge this account with all labor and supplies used incident to clearing and grubbing the same for any purpose. Close this account into Surface Expense each month.

0-28. Highways.—Charge this account with all Surface and Teaming labor also supplies used in building New Highways or repairing old ones on company property. Close this account into Surface Expense each month.

0-29. Rents.—Charge this account with all labor and supplies used to repair and maintain all dwellings and other buildings on which the company collects rent. The charges to this account are intended to cover all cost of repairs and ordinary alterations on buildings mentioned above.

Additions to buildings and new foundations, cellars, etc., will be treated as New Construction.

This account is credited with all rent collected, both for buildings and leased land.

The balance of this account each month is closed into Surface Expense.

Application for Dwelling.—Any employee desiring a dwelling must have worked for the company at least 30 days before an application will be considered. A regular form is used for this purpose as follows, form 19, Fig. 39.

This form must be filled out by the applicant and approved by his foreman before being sent to the Mine Clerk. The allotment of houses is a matter of judgment, with the best interests of the company in view. Houses are allotted by the Superintendent.

Dwelling Lease.—Form 17, Fig. 40. When an application is allowed and a house allotted, the Mine Clerk will make out in duplicate a Dwelling Lease, which must be signed by the Superintendent for the company and by the applicant. The original copy goes to the applicant and the duplicate is placed on file in the mine office. When a dwelling is vacated the lease is so endorsed and removed from the live file.

Land Lease.—Form 18, Fig. 41. A person wishing to lease land for the company for building or other purposes, will make application to the Superintendent, and on the approval of the General Manager, a Land Lease will be made out in duplicate, covering the particular piece of property in question. This lease will be signed by the Superintendent for the company and by the applicant, also by his wife if he is a married man. The original copy goes to the applicant, the duplicate to the mine clerk to be placed on file. In the event of a party disposing of his building and

Ojibway Mining Company

This is to certify that..... has been employed in my department as..... for at least one month last past, and that his work has been satisfactory. I recommend favorable action on his application for a dwelling-house.

.....
190.....

The undersigned hereby makes application for..... a dwelling-house, and promises to fulfil all requirements of the Company in reference to the same, when it shall have been assigned to him.

Name.....
Nationality..... Age..... years
Occupation.....
Married or Single.....
Names and ages of children.....
.....
.....
.....
.....

Name and address of next nearest of kin:
.....
.....

Last place of employment.....
Date of application.....

FIG. 39.—FORM 19.

surrendering his lease, a proper surrender and release of the same must be drawn up and signed. The original lease should be surrendered and this release attached to it and placed on file.

DWELLING LEASE

DWELLING OR BOARDING HOUSE LEASE. (COPY)

Form 17 9-7-500

This Agreement. Made this..... day of..... A. D., 19.....

BETWEEN the....., a corporation duly organized under the laws of the State of Michigan, party of the first part, and..... of the County of Keweenaw, party of the second part;

Witnesseth. That said party of the first part hath agreed to let, and hereby doth let, and the said party of the second part hath agreed to hire, and hereby doth hire, the following described premises belonging to the party of the first part, and in said County situated, to-wit:

.....
.....
.....
.....

To be used and occupied solely for a dwelling house—boarding house for boarding and lodging the employes of the party of the first part by the party of the second part—for which said party of the second part agrees to pay to said party of the first part.....dollars per month for each and every month of such occupation, and a proportional part thereof for any part of a month, payable on the.....day of each month; the first payment to be made on the.....day of.....A. D., 19... Provided, however, and this lease is upon the following express conditions, to-wit: That if the party of the second part shall refuse or neglect to pay the rent above mentioned at the time above mentioned; or shall let, demise, sell, underlet or assign this lease, or the whole or any part of said premises, without the consent of the party of the first part thereto obtained; or shall sell, or suffer to be sold, in or upon said premises, any spirituous or intoxicating liquors;

or shall refuse or neglect to keep said premises in good preservation (ordinary wear and tear and damages by the elements excepted); or shall continue to occupy or hold, or suffer to be occupied or held, said premises beyonddays after said party of the second part ceases to be an employe of the party of the first part, whether because of being discharged by the party of the first part, or on voluntarily terminating his relation as employe to the party of the first part. In such and in any such case it is hereby expressly understood and agreed that this lease shall, at the option of the party of the first part, wholly cease and determine, and it shall thereupon be lawful for the party of the first part to re-enter into and re-possess and recover said premises, and the party of the second part, and any other occupant, to remove and put out, and in such or in any such case it is expressly agreed that no notice to quit whatever shall be required to be given by the party of the first part to the party of the second part.

It is further agreed, that should the said party of the first part wish to terminate the tenancy hereby created, for any cause or reason whatsoever, other than those mentioned in the preceding conditions (although said party of the second part should have fulfilled, performed and kept each and every condition and covenant thereof), it may do so at any time by giving said party of the second partdays' notice of such wish (and such notice shall not be required to terminate at the expiration of any rental period), and at the expiration of such.....days this lease shall wholly cease and determine, and the said party of the first part shall thereupon and without further notice, be entitled to immediate possession of said premises, and to recover the same, and to remove and put out the party of the second part, or any other occupant. The said party of the second part covenants and agrees to keep, perform and observe each and all of the conditions herein mentioned.

It is further agreed, that said first party may retain, out of any moneys due, or to become due, from it to said party of the second part, any rent due or to become due hereunder, and also an amount sufficient to fairly compensate said first party for any injury done, or suffered to be done, to said premises by said party of the second part, contrary to the terms hereof.

In Witness Whereof. The party of the first part hath caused these presents to be signed by its Superintendent, duly authorised, and the party of the second part hath signed the same the day and year first above written.

In Presence of

FIG. 40.—FORM 17.

LAND LEASE

Form 18 9-7- 300

This Indenture. Made this.....day of.....A. D., 190... between the.....a corporation organized under the laws of the State of Michigan, and doing business in the County of Keweenaw, in said State, party of the first part, and.....of the second part,

Witnesseth. Said party of the first, for and in consideration of the sum of.....Dollars to be paid in each and every month during the tenancy herein provided for, and of the covenants and agreements hereinafter mentioned, has leased, and by these presents does demise and lease, unto the said part.....of the second part,.....executors, administrators and assigns for twenty-one years from the day and date hereof, the surface of the described following premises, to-wit:

all in Keweenaw County, Michigan.

To be used by said part.....of the second part while.....he.....in the employ of the said party of the first part, as a place for the erection of a Dwelling House and its appurtenances, to be occupied by.....and for no other purpose, without the written consent of the said party of the first part first obtained.

It is expressly agreed that said part.....of the second part shall have the use of said land for the purpose above mentioned only while.....continue...in the employment of said first party.

It is further agreed that, whenever said part.....of the second part cease.....to work for said party of the first part, for any cause,.....shall, within.....days, provided the rent then due from said second part.....to said first party is then paid in full, (and if any bonus paid by said first party to second part.....is repaid to said first party by said second part.....) remove any Dwelling House or other buildings and appurtenances erected upon said premises by....., and leave said premises in as good condition as when entered upon; unless said party of the first part elects to purchase said Dwelling House, or other buildings and appurtenances.

It is further expressly agreed that said first party may at any time at its option, upon ninety days' written notice, terminate this lease and purchase said Dwelling House, or other buildings and appurtenances which may have been erected upon said premises by said second part....., heirs or assigns. Notice of the election of said first party to so purchase shall be deposited in the United States mail in the Post Office at....., Michigan, enclosed in a sealed envelope, with legal postage thereon fully prepaid, addressed to said part.....of the second part.....heirs or assigns, at his, her, their, or any of their last known place or places of residences; and on the expiration of ninety days after said notice is so deposited as aforesaid, in said Post Office, said lease shall thereby be terminated.

Whenever under any of the terms of this lease said first party shall elect to purchase said Dwelling House, or other buildings and appurtenances, which may have been erected upon said premises by said second part....., heirs or assigns, it may do so at the value thereof, to be determined by the Superintendent of said first party and said second part....., or.....heirs, executors, administrators or assigns, within ten days from the date of the notice of the election of said first party to purchase; and in case they cannot agree upon said value within said ten days, then they shall, within five days after the lapse of said ten days, select some competent person to determine the same, who shall determine the same within ten days after his selection: and in any event in computing said value there shall be deducted by the persons or person determining the same, any and all rent then due, or to grow due from said second part....., heirs or assigns, to said first party, (and also any bonus paid to said second part.....by said first party) which sum after making said deductions, shall be paid by said first party to said second part....., heirs or assigns, if and when said second part....., heirs or assigns shall vacate and surrender said premises to said first party.

And it is expressly understood and agreed by the parties hereto, their respective heirs, executors, administrators, successors, and assigns, that the whole amount of rent reserved and agreed to be paid by second part.....for said above demised premises, and each and every installment thereof, (and any bonus that may have been paid by said first party to said second part.....) shall be and are hereby declared to be a valid and first lien upon any and all buildings and improvements that may have been, or that may at any time in the future be erected, placed or put upon said premises by said part.....of second part....., heirs or assigns, and that whenever and as often as any installment of rent shall become due, and remain unpaid for.....days after the same becomes due and payable, said party of the first part, its agent, attorney, successors or assigns, may sell at public auction, to the highest bidder, for cash, after having first given notice of the time and place of such sale, by posting up notice thereof in three public places in the Township of.....at least ten days previous to the time of such sale, all the buildings and improvements on said premises, and as attorney of said part.....of the second part, hereby irrevocably constituted, may make to the purchaser or purchasers thereof a suitable and proper transfer, bill of sale or other conveyance and out of the proceeds arising from such sale, after first paying the costs and expenses of such sale, including attorney fees, retain to itself, its successors or assigns, the whole amount due on said lease up to the date of said sale for such rent and bonus, rendering the surplus, if any, to the said part.....of the second part....., heirs, executors, administrators or assigns, which sale shall be a perpetual bar to and against all rights and equities of said part.....of the second part....., heirs, executors, administrators and assigns, in and to the property sold.

Said second part.....also agree.....not to sell or assign this lease without the written consent of said first party, and not to keep for sale, or sell or distribute, or permit to be sold or distributed any merchandise, or any brewed or intoxicating liquors on said premises; a violation of any of the provisions in this paragraph contained shall operate as an immediate forfeiture of this lease, and thereupon said first party, its successors or assigns, may, without notice, immediately bring an action under the statute to oust said second part....., or.....assigns.

In Witness Whereof. The said party of the first part has caused these presents to be executed in its

behalf by its Superintendent, thereunto duly authorized, and said second part.....ha.....set.....
hand.....and seal.....the day and year first above written.

Signed, Sealed and Delivered in presence of)
.....
..... By
..... Superintendent.
..... [L. S.]
..... [L. S.]

FIG. 41.—FORM 18.

Rent Record Cards.—In order to keep a proper record of each dwelling, the rent collected, occupants, repairs, etc., a record is kept with each dwelling on cards (form 32, Fig. 42). When a dwelling lease is executed and the duplicate copy is received by the Mine Clerk, he will enter on the Rent Card assigned to the house in question, the date of the lease, the occupant's name, his pay book number and in case he is only

DWELLING	TYPE			BUILT	BY	COST			
	Made Double Outside								
ROOMS	UP	DOWN	CELLAR	BARN	LIGHTS				
Occupied	Individual			Vacated	Occupied	Individual			Vacated
MONTHLY RENTAL					WATER CHARGE		IS WATER INSIDE?		
19	19	19	19	19	19	19	19	19	19
Jan.									
Feb.									
to									
Nov.									
Dec.									

FIG. 42.—FORM 32.

renting part of a house, that is, the up or down stairs, that must also be shown. The rental per month for each dwelling or part thereof is fixed by the Superintendent.

An employee vacating a rented house cannot secure a settlement from the Clerk, until the house has been examined and reported upon by the Carpenter Foreman. Any damage to a dwelling caused by ill usage will be charged to the occupant.

On the reverse side of the Rent Cards will be posted each month the details of any repairs made.

STAMP MILL—CLOSED ACCOUNTS

0-40. Steam Plant Stamp Mill.—Charge this account with:

Firemen as per time book
Coal passers per time book
Water Supply, proportion

Elect. Lt. and Power, proportion
Supplies as per supply book
Fuel as per supply book
All repairs to building and plant.

This account is closed out each month to the various accounts benefited on a basis of horse-power used.

0-41. Pumping Stamp Mill.—Charge this account with:

Engineers as per time book
Steam Plant, proportion
Elect. Lt. and Power, proportion
Supplies as per supply book
All repairs to building and Equipt.

This account is closed out each month to the various accounts benefited on a basis of water used.

0-42. Electric Light and Power Stamp Mill.—Charge this account with:

Engineers as per time book
Steam Plant, proportion
Supplies as per supply book
All repairs to Generating Plant and Equipt.

This account is closed out each month to the various accounts benefited on a basis of kws. used.

0-43. Rolls.—Charge this account with all labor and supplies to operate and maintain the Rolls. This account will be divided between the Heads, on a basis of cost for the month for Rolls for each Head.

0-44. Regrinding.—Charge this account with all the labor and supplies to operate and maintain the Regrinding Mills. This account will be closed out each month to the Heads, on a basis of cost for the month for Regrinders for each Head.

0-45. Screens and Elevators.—Charge this account with all labor and supplies to operate and maintain the Elevators and revolving Screens. This account will be divided between the Heads on a basis of cost of Screens and Elevators for the month for each Head.

0-46. Jigs.—Charge this account with all labor and supplies to operate and maintain all Jigs. This account will be closed out to the Heads each month on a basis of cost of Jigs for the month for each Head.

0-47. Tables and Vanners.—Charge this account with all labor and supplies to operate and maintain the Tables and Vanners. This account will be closed out to the Heads on a basis of cost of Tables and Vanners for the month for each Head.

0-48. Conveyor.—Charge this account with all labor and supplies to operate and maintain the waste sand Conveyor. This account will be closed out to the Heads on a basis of tons stamped.

0-49. Laboratory.—Charge this account with all labor and supplies to operate and maintain the Laboratory. This account will be closed out to the Heads on a basis of tons stamped.

0-50. Wash Account.—Charge this account with,

Wash Foreman as per time book

Wash laborers as per time book

Supplies as per supply book

All labor and supplies to operate and maintain the Wash department except Rolls, Regrinding Mills, Jigs, Tables and Vanners.

This account will be closed out to the Heads on a basis of tons stamped.

0-51. General Expense.—Charge this account with:

Office expense

Surface Expense

Rents—balance

Waters Supply, proportion

Elect. Lt. and Power, proportion

All labor and supplies to repair and maintain the Mill building, Rock bins, Trestles, etc.

This account will be closed out to the Heads on a basis of tons stamped.

0-52. Rents, Stamp Mill.—Charge this account with all labor and supplies to repair and maintain all dwellings and other houses at the mill on which the company collects rent. This account will receive credit for all rents collected. The account is closed out to General Expense.

SUB-ACCOUNTS—SIDE LEDGER

2-1, Etc. Construction Accounts.—A separate account is kept with each.

A. Building

B. Equipt. of each Plant

C. Water Lines

D. Sewer Lines

E. Air Lines on Surface

F. Electric and Telephone Lines

G. Dams

H. Railroads

I. Trestles

J. Portable Machinery and Equipment.

In making charges of labor and supplies to any construction accounts, the following subdivisions will be observed, in order to have proper information of costs in comparing like jobs and for insurance purposes.

BUILDINGS

A. Excavation

B. Grading and Filling

C. Foundations

D. Superstructure

E. Electric Wiring and fixtures

F. Heating plant

G. Bath room fixtures, lavatories

H. Painting inside and out

I. Barn and outhouses.

COMPRESSOR EQUIPMENT

- | | |
|--------------------|---------------------------|
| A. Foundations | D. Supplies |
| B. Compressor cost | E. Installation complete. |
| C. Receivers cost | |

ELECTRIC PLANT EQUIPMENT

- | | |
|---------------------------|-----------------------|
| A. Foundations | F. Transmission lines |
| B. Generating outfit cost | G. Telephone lines |
| C. Installation | H. Transformers |
| D. Switchboard cost | I. Misc. |
| E. Installation | |

HOISTING EQUIPMENT

- | | |
|----------------|---------------------------|
| A. Foundations | D. Installation |
| B. Hoists cost | E. Pulley Stands, Sheaves |
| C. Supplies | F. Ropes. |

PUMPING PLANT

- | | |
|--------------------|-----------------|
| A. Foundations | D. Installation |
| B. Pumps cost | E. Misc. |
| C. Condensers cost | |

ROCK HOUSE EQUIPMENT

- | | |
|------------------|-----------------------|
| A. Crushers cost | D. Power Transmission |
| B. Hammers | E. Installation |
| C. Motors, etc. | F. Misc. |

SHOP EQUIPMENT

- | | |
|----------------------------|-----------------------|
| A. Foundations | D. Power Transmission |
| B. Tools itemized | E. Installation. |
| C. Motors and Transformers | |

STEAM PLANT EQUIPMENT

- | | |
|----------------------|-------------------|
| A. Foundations | F. Economizer |
| B. Boilers cost | G. Installation |
| C. Breeching cost | H. Stack complete |
| D. Pumps | I. Misc. |
| E. Feed water heater | |

PIPE LINES

- | | |
|----------------------|---------------------------|
| A. Excavation | D. Pipe covering complete |
| B. Pipe and Fittings | E. Filling. |
| C. Installation | |

DAMS

- | | |
|------------------|------------|
| A. Excavation | C. Filling |
| B. Concrete work | D. Misc. |

RAILROAD

- | | |
|------------------------|-------------------|
| A. Grading and Filling | C. Rails and Ties |
| B. Culverts | D. Misc. |

TRESTLES

- | | |
|---------------|----------|
| A. Excavation | D. Floor |
| B. Piling | E. Misc. |
| C. Structure | |

PORTABLE MACHINERY AND EQUIPMENT

- | | |
|---------------------|---------------------------------|
| A. Rock Drills | F. Portable Hoists |
| B. Pumps | G. Derricks |
| C. Tram Cars | H. Sinking Buckets |
| D. Skips | I. Live Stock |
| E. Portable Boilers | J. Wagons, Sleighs and Buggies. |

Into this account should be charged machinery and equipment that will not be used permanently in one place, so that it cannot be charged to some construction or equipment account.

3-1, Etc. Development Accounts.—Separate accounts will be kept as follows:

- A. Shaft Sinking, separate account each shaft.
- B. Shaft Construction, separate account each shaft.
- C. Plats, separate account each shaft.
- D. Crosscuts, separate account each one.
- E. Raises, separate account each one.
- F. Winzes, separate account each one.
- G. Drifts, separate account each one.
- H. Diamond Drilling.
- I. Surface Exploration.

Each of these accounts is made up of the following, except Diamond Drilling and Surface Exploration.

- | | |
|--------------------------------------|-----------------------------|
| A. Miners labor | G. Pumping, proportion |
| B. Miners supplies | H. Timbering, proportion |
| C. Compressor, proportion | I. Trammig, proportion |
| D. Air lines, proportion | J. U. G. Cars, proportion |
| E. Power Drills, proportion | K. U. G. Tracks, proportion |
| F. General U. G. Expense, proportion | L. Hoisting, proportion |
| | M. Rock House, proportion. |

The cost of Shaft Sinking is intended to cover all labor and supplies used by miners in sinking plus a proportionate part of the other accounts. This statement also applies to Drifting, Raising, Winzes, Crosscuts and Plats.

The cost of Shaft Construction is intended to cover all labor and supplies used for Timbering, building Skipway and Tracks, Ladder road, Concrete Collar, Water lines, Air lines, Bell lines. The cost of Diamond Drilling is intended to cover all labor and supplies used in running and

maintaining the drill and moving the same from place to place, plus a proportionate part of Compressor expense for power.

Surface Exploration is intended to cover all labor and supplies used in surface trenching, etc.

For Diamond Drill work a daily report is made out by the drill runner on (form 60, Fig. 43), covering the operations and results of the work for the shift; reports for each shift worked will be sent to the Superintendent.

Form 60		MINING CO.
Daily Report.		Shift
Name of Drill		
Number of Hole		
		190
Depth from Surface, end of Shift		Feet
" " " beginning " "		"
Distance Drilled, - - -		"
inch Stand Pipe put in,		"
" Casing " "		"
From Feet	To Feet	Material
Remarks		
		Foreman.

FIG. 43.—FORM 60.

The details of the cost of Diamond Drilling is entered on cards (form 61, Fig. 44) the cost data on one side and the operating data on the other side.

4-1, Etc. Mining Expense, Stopping.—A separate account is kept with each stope, made up of the following:

- | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>A. Miners' labor</p> <p>B. Miners' supplies</p> <p>C. Compressor, proportion</p> <p>D. Air lines, proportion</p> <p>E. Power Drills, proportion</p> <p>F. General U. G. Expense, proportion</p> | <p>G. Pumping, proportion</p> <p>H. Timbering, proportion</p> <p>I. Trammig, proportion</p> <p>J. U. G. Cars, proportion</p> <p>K. U. G. Tracks, proportion</p> <p>L. Hoisting, proportion</p> <p>M. Rock House, proportion.</p> |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

[illegible]

FIG. 44.—FORM 81.

OJIBWAY MINING COMPANY MILL DEPARTMENT Daily supply report for 24 hrs. beginning 7 A.M. _____ 191____									
SHOES									
Old shoes taken off					New shoes put on				
Head No.	Maker	Mark	Time	Weight	Head No.	Maker	Mark	Time	Weight

OILS AND WASTE				
Where used	Cylinder	Engine	Lubricating	Oil put in tanks
Heads				
Wash				
Mill				
Boilers				
Pumps				
Tank reading				
Report name, gallons and kind of oil put in tanks.				

REPAIRS			
Repairs include all castings (hard and soft) grates, screens and liners of all kinds.			
Head No.	Casting No.	Weight	NAME AND REMARKS

REMARKS			
----- Millrunner 7 A.M. - 6 P.M. -----		----- Millrunner 6 P.M. - 7 A.M. -----	

FIG. 46.—FORM 106.

The cost of Stoping is intended to cover all labor and supplies for breaking rock in stopes, plus proportionate part of the other accounts.

6-1, Etc. Stamping Head No. 1-Expense and Head No. 2-Expense.—
These accounts comprise the following charges:

- | | |
|----------------------------------|-------------------------------------|
| A. Mill runners as per time book | I. Revolving Screens and Elevators, |
| B. Head runners as per time book | Proportion |
| C. Head feeders as per time book | J. Rolls, proportion |
| D. Spare hands as per time book | K. Regrinding, proportion |
| E. Steam Plant, proportion | L. Surface |
| F. Pumping, proportion | M. Carpenters |
| G. Elect. Lt. and Power-Power, | N. Machinists |
| proportion | O. Blacksmiths |
| H. Elect. Lt. and Power-Light, | P. Teaming |
| proportion | Q. Electricians |
| | R. Supplies |

WASH

- | | |
|-------------------------------|-------------------------------|
| A. Foreman, proportion | F. Electric Power, proportion |
| B. Labor, proportion | G. Jigs, proportion |
| C. Shop Labor | H. Tables, proportion |
| D. Supplies | I. Conveyor, proportion |
| E. Electric Light, proportion | J. Laboratory, proportion |

GENERAL

- | | |
|--------------------|-----------------------------|
| A. Office Expense | D. Electric Light and Power |
| B. Surface Expense | E. Rents |
| C. Pumping | |

Ojibway Mining Company													
Daily Report for the 24 hours beginning 7. a. m. _____ 190__													
Grade	No. of Bbls.	Net Weight											
								Rock received Cars					
								Coal put in bin Tons					
								All heads run		Hours	Minutes		
								Mill run		Hours	Minutes		
								General tallings for					
								Mineral shipped					
								Mineral at Mill					
Totals								Total Mineral to date					
Remarks:													
_____ Mill Supt.													

FIG. 47.—FORM 111.

The Stamp Mill accounts are made up from the time books, which contain the distribution of labor and detailed statement of supplies used.

Reports covering the operation of the Electric, Steam, and Pumping plants at the mill are similar to those employed at the mine.

A Daily Report covering the operation of the mill will be made out each day to cover 24 hours. See form 105, Fig. 45.

A Daily Supply Report (form 106, Fig. 46) covering the consumption of supplies, a record of the wear of stamp shoes, and a statement of the repairs to Heads, is made out each day by the Master Mechanic and sent to the Mill Superintendent.

A Daily Mineral Report (form 111, Fig. 47), is made out each day in duplicate; one copy will go to the mine clerk and a copy to the Mill Superintendent. Both the Mine and Mill clerks will enter these daily reports in books ruled for the purpose, showing the various grades, form 101, Fig. 48.

MINERAL STATEMENT							Month of		
Date	Brl. Wk.	Hds.	#1	#2	#3	#4			Total
1									
2									
3									
<hr/>									
30									
31									
Total									

FIG. 48.—FORM 101.

The calendar month is divided into four periods for convenience, as follows, 1st to 7th, 8th to 14th, 15th to 21st, and 22nd to last day of the month inclusive. A Mineral Report (from 107, Fig. 49), will be made out at the end of each period, showing the mineral shipped for the period, also for the month to date, and such other information as the report calls for. Send one copy to the General Manager and one to the Superintendent.

From form 107 the General Manager makes out a report to the Head Office on form 26, Fig. 50.

OJIBWAY MINING CO.

MILL DEPARTMENT

Winona, Mich. _____

The following is the Mill Report for the period ending _____
 The month will be divided into four periods as follows: 1st to 7th, 8th, to 14th, 15th to 21st, 22nd to last day inclusive

GRADE	Net Weight	Total Net Wt. to date	Cans rock received	Total to date
H			Cans rock stamped	Total to date
1			Tons rock stamped	Total to date
2			Average running time per hour	hrs. min.
3			Average number tons rock stamped per hour, per 24 hours	
Regrinding			Average number tons rock stamped per hour, per 24 hours running time	
Mass			Number pounds mineral, per ton rock stamped	
Totals				

REMARKS

FIG. 49.—FORM 107.

Form 26-500-11 06

PERIOD

1st to 7th—1st
 8th to 14th—2nd
 15th to 21st—3rd
 22nd to Last Day 4th

MONTH

Ojibway Mining Company

MINERAL REPORT

..... 19.....

	Cars Rock Brought to Mill	Tons Rock Brought to Mill	Tons Rock Stamped	Pounds Mineral per Ton Rock Stamped	Grade	Pounds Mineral	Per cent.	Per cent. of Mineral per Ton Rock, Mill	Average of Tailing Assay
...									
...Period									
Total from 1st of mo. to date.									
Pounds Heavy Copper from Mine									
Total Mineral for Month									

Remarks:

Yours Respectfully,

.....
Gen. Mgr.

FIG. 50.—FORM 26.

8-1. Office Purchasing Agent.—Charge this account with the following:

Purchasing Agent, salary	Postage
Stenographer, salary	Supplies
Rent and Light	Janitor service
Telephone	

8-2. Office Mine.—Charge this account with the following:

Superintendent, salary	Postage
Clerk and Assts., salary	Supplies
Stenographer, salary	Heating system
Timekeeper, salary	Electric Light
Janitor services	Telephone

17-1. General Supplies.—All supplies not provided for by other subdivisions of the supply account are placed under this head.

17-2. Iron and Steel.—Included under this head are:

Bar Iron and Steel	Wire rope
Iron and Steel Plate	Chain
Structural steel	Corrugated Iron
Castings	Bolts, all kinds
Rails and fastenings	Tram cars
Nails and spikes	Skips
Drill and tool steel	Sheaves
Air Drills and parts	Sinking buckets
Pumps and parts	

17-3. Explosives.

Powder	Fuse
Caps	Electric exploders

17-4. Cement, Etc.

Cement	Sewer pipe
Lime	Sand
Brick	Rock
Fire clay	Wall plaster

17-5. Lumber and Timber.

Lumber	Slabs
Timber	Ties
Flat timber	Doors and Windows
Lagging	Interior finish
Poles	

17-6. Machinery.

Engines	Condensers
Boilers	Air Receivers
Crushers	Power Metal working machines
Compressors	Power Wood working machines

17-7. Pipe and Fittings.

Elbows, tees, crosses, couplings, bushings, pipe,
Valves, whistles, traps, gauges, lubricators, etc.

17-8. Oil and Grease.

Lubricating oils
Grease
Kerosene and gasolene

Candles and Sunshine
Rope dressing
Belt dressing

17-9. Electric Supplies

Lamps
Fixtures
Wire
Meters

Motors
Transformers
Telephones
All Electrical supplies

17-10. Tools.

Machinists hand tools
Blacksmiths hand tools
Carpenters hand tools

Masons hand tools
Shovels, Picks, Hammers, Jacks, etc.

17-11. Stamp Mill.

All supplies for Mill.

18-1. Soft Coal.**18-2. Hard Coal.****18-3. Blossburg Coal.****18-4. Coke.****18-5. Family Wood.****18-6. Boiler Wood.****18-7. Stamp Mill—All fuel.**

20-1. Loss and Gain on Supplies, Adjustment.—Charge to this account:

Supply Clerks wages

Electric Light and Power proportion

Expense of running supply house

Heating System proportion

Expense of hauling and unloading freight and fuel

Charged off to the various classes of supplies and fuel purchased, by journal entry, from itemized statement on each invoice passing through the supply records. The charge is usually at the rate of 5 per cent. of the purchase price, to cover the cost of handling.

20-2. Manufacturing Supplies.—Charge all labor and material to this account for manufacturing supplies in the shops. Each job has a shop order number.

Credit this account and charge supplies with the cost of finished material when job is completed, this is done by journal entry.

20-3. Hoisting Ropes.—Charge new hoisting ropes to this account and pro-rate out to accounts benefited an equal proportion each month so as to close the account at the end of the calendar year. This distributes the cost of new ropes to the operating accounts evenly over a period of time, instead of having an excessive cost in any one month.

MINE BOOKS—GENERAL ACCOUNTING

The account books for the mine and mill are kept at the mine office, and consist of the following:

Cash book, ruled 5 columns	Voucher Record
Journal, ruled 3 columns	Pay-roll
Ledger, loose leaf	Time books
Side Ledger, loose leaf	Settlement book
Check Register	

Cash Book, Receipts.—All cash receipts when entered in the Cash Book are classified as follows:

the first column, Treasurer.

second column, Accounts Receivable.

third column, Sundry Receipts.

The last column is used to carry the balance and extend totals.

At the end of the month summarize your receipts as follows:

Treasurer	.....	.....
Accounts Receivable	.....	.....
Sundry receipts	.....	.....

Cash Book, Payments.—All payments are made by check, no cash whatever being paid out, payments are posted to the Cash Book from the Check Register, according to date, and the amounts are classified under the following headings: Labor previous month, Labor current month, Bills Audited previous month, Bills Audited current month, the last column is used for totals and balance.

At the end of the month summarize your payments as follows:

Sundry Labor January	.....	.....
Sundry Labor February	.....	.....
Bills Audited January	.....	.....
Bills Audited February	.....	.....
Total Payments	.....	.....
Balance	.....31—19—	.....

The amount for the Cash Book entry covering Pay-roll checks issued on pay day is arrived at in the following manner: Deduct from the net amount of the Pay-roll for the month in question, the total amount of settlements issued against that month. Pay-roll checks issued on pay day are not entered in the Check Register.

Journal.—The first entry for the month is *Sundry Labor to Sundries* itemized which comprise deductions made on the Pay-roll which are to be credited to operating or suspense accounts. In other words it is not necessary to draw checks for them. The sum of these deductions plus the net amount of the pay-roll equals the gross amount of the time books.

The second entry is *Sundries to Sundries* itemized as follows:

Sundry Labor, pay-roll total, as per Cost Sheet page 0
 Shop Accounts, total amounts, as per Cost Sheet page 6
 Closed Accounts, total amounts, as per Cost Sheet page 7-7 1/2
 Supplies, as per supply summary, total
 Fuel, as per supply summary, total
 Bills Audited, as per Voucher Record, total.

From each of the above sheets the details have been posted direct to the proper ledger account. This is a skeleton entry.

The third entry is *Sundries to Supply Adjustment Account*.

This entry is for the amounts charged to the various classifications of supplies and fuel. It is 5 per cent. of the face of the invoices that have passed through the various classifications during the month, and represent the cost of handling the supplies and fuel at the mine. This information is secured from a memo. kept by the clerk showing the distribution according to the various supply classifications of the Handling Charges against each invoice passing to the supply accounts. Another memo. is kept showing the distribution of Freight and Express charges.

The fourth entry is *Sundries to Sundries* as follows:

Shop Accounts Stamp Mill total, Cost Sheet page 5
 Closed Accounts Stamp Mill total Cost Sheet page 6 1/2
 Supplies Stamp Mill total Supply Summary
 Fuel Stamp Mill total Supply Summary.

Misc. entries will follow the above.

The last entry will be General Expenditures to

Surface Expense	Development
Office Expense	Transportation
Incidentals	Stamping
Mining Expense	

Ledgers.—In the General ledger will be kept the main and controlling accounts, the sub-accounts will be kept in a side ledger, also shop and closed accounts, that is, accounts that are closed out each month.

Check Register.—Each check issued, except labor checks issued on pay day are entered in this book (Fig. 51). All checks issued, except pay day checks, are signed by the clerk and countersigned by the Superintendent. Pay day checks are signed by the clerk.

The bank account will also be kept in this book.

Voucher Record.—All vouchers are entered in this book (Fig. 52) and the distribution shown to the various supply accounts, Fuel, Office, Incidentals or Misc. charges. The total amount of Vouchers for the month are journalized as per entry No. 2. The totals of the other columns are posted direct to their proper ledger accounts, except the Misc. column from which each item is posted to its proper account. All supplies

[illegible]

Fig. 53.

received and all services performed during any one month are charged into that month's accounts.

Vouchers (Fig. 53) are made out in duplicate with invoices attached, and on the reverse side a distribution of the charges is shown corresponding with the entry in the Voucher Record. All Vouchers are signed by the clerk and approved by the Superintendent.

Engaging Labor.—A person seeking employment with the company will naturally apply to the foreman of the department in which he wishes to work; if the applicant is considered favorably and help is required a slip (form 22, Fig. 54) is made out by the foreman and the applicant

Form 22-9-7-1000		.....19.....
To THE CLERK:		Book No.
Dear Sir:		
The bearer.....		
has applied for a position as.....		
.....with the Ojibway Mining Co. to begin work		
.....19.....		
		Foreman

FIG. 54.—FORM 22.

sent to the office with it. The clerk will fill out a Pedigree card (form 27, Fig. 55) with all information called for, and submit it to the Superin-

Name:		Occupa.:	Book No.:
Place and Date of Birth		Immigrated	
Reads, Writes, Speaks English.		Married, Single, Widower.	
No. of Children		Sons Born	
Names and Addresses of Nearest Relatives			
Last Employed		How Long	Occupa.
I hereby apply for membership under the Aid Fund and agree to abide by its rules			
Signature		Date of Application	
Date of Employment		Date of Leaving	

FIG. 55.—FORM 27.

tendent for his approval. If the application is approved by the Superintendent the clerk will issue a numbered pay book, and also give him a copy of the Aid Fund rules. Possession of the Pay Book is authority of the foreman for putting the man to work.

The Pedigree cards are filed in a two drawer cabinet, live cards on one side, dead ones the other. Cards of rejected applicants are filed on the dead side, the card is marked rejected. When an employee resigns or is discharged, his card will be marked accordingly and placed in the dead side for future reference.

When an employee resigns or is discharged, his foreman makes out a slip (form 21, Fig. 56) requesting a settlement, which the man will present with his pay book to the timekeeper. The timekeeper will make out a settlement (form 5, Fig. 57). Earnings must be taken from the pay-roll only if for the previous month, and for the current month, from the time book. Deductions will be made for supplies or fuel, also store, board, etc. In issuing settlements, details for the current month only will be shown, for the previous month refer to the Pay-roll. When a settlement is issued the timekeeper will turn it over to the clerk.

.....19.....
<i>To the Timekeeper:—</i>
<i>Please give.....</i>
<i>No....., a settlement.</i>
<i>.....</i> <i>Foreman</i>

FIG. 56.—FORM 21.

All settlements will be entered in the settlement book, Fig. 58. If an employee has time coming for two separate months, it is necessary to make a separate entry in the settlement book for each month.

Time Books and Timekeeping.—Each foreman will keep the time of his men in a pocket time book for reference. The timekeeper will keep the time in a time book ruled for 31 days, of large size. The time of all men employed above ground will be posted to the time book from the Individual Returns (form 12, Fig. 63) which each man is required to make out each day, showing what he has been doing and the time spent on the various jobs. Each foreman must O K the slips of his men before he turns them over to the timekeepers. An explanation of the Job Order system will be found under Division of Labor.

The total time represented by each slip is posted to the credit of the particular employee concerned in the office time book. The amount

of money represented by the time worked on each job is entered on the slip by the timekeeper. These amounts are based on the rate of pay for 10 hours' work. Exceptions to this rule are Engineers, Firemen, etc., also foremen on salary. Employees on a salary basis turn in 10 hours a day for each working day. After the time has been posted from the Individual Returns, they are turned over to the clerk having the Distribution of Labor in charge.

The time of all Underground employees is kept by the Shift Bosses in pocket time books, and is reported to the Timekeeper once in 24 hours.

SETTLEMENT		19__
To the Clerk of the OJIBWAY MINING CO.		
_____ has worked on _____		
at this _____	days at the rate of _____	
dollars (\$ _____) per month		\$ _____
Contract _____		
Not Transferable or Negotiable	TOTAL CREDIT, _____	
	DEDUCTIONS.	
	Supplies \$ _____	
	Fuel _____	
	Doctor and Club _____	
	Board Bill _____	
	Store _____	
	AMOUNT DUE _____	

FIG. 57.—FORM 5.

As miners actually work only five shifts a week, the following rule will be observed in giving them time. A miner who works five shifts in a week will be given credit for six shifts. Miners who do not work the five shifts in a week will receive credit only for the time actually worked.

The timekeeper will classify the labor in the time book in the following order:

- | | |
|------------------------------------------|---------------------|
| × Captains and Shift Bosses | Landers Surface |
| Miners Company Account | Landers Underground |
| × Miners Contract—each contract separate | × Engine boys |
| × Selectors | Pumpmen |
| × Blockholers | Pipemen |
| × Wallers | Timbermen |
| Trammers | × Change house men |
| Track repairers | × Sprinkler |

Space must be allowed to show a Distribution of Labor of all the above classifications in the time book except those marked thus, ×, which are not distributed.

× Surface	× Engineering Department
× Teams	× Masons
Company Teamsters	Engineers
× Carpenters	Firemen
× Machinists	Pumpmen
× Blacksmiths	Rockhouse
× Electricians	

Space must be allowed to distribute those classifications not marked with a cross. Those marked with a cross make returns on Individuals Returns.

The time book should be made up as soon after the end of the month as possible, and when proved, a Summary of the Time and Earnings will be made out for each of the classifications as shown above. This Summary should be entered in the time book following the month in question.

Pay-roll.—The Pay-roll, Fig. 59, is made up from the time book. The employees names are entered according to the pay book numbers in numerical order. After posting is completed, check the total against the time book summary for proof. After this is done check all Settlements issued for the month in question, from the Settlement book to the Pay-roll.

Post deductions as follows:

Rents, from the rent cards
 Supplies, from the supply sheets
 Fuel, from the supply sheets
 Doctor, charge as per Aid Fund Rules
 Aid Fund, 50 cents for each employee working over three days
 Board, as per board bills turned in
 Store, as per list of collections sent in. A charge of 2 per cent. of the amount collected is made for this service and 25 cents for each assignment turned over. These collection fees are credited to Office Expense. Also any fees received in connection with Garnishment proceedings.

Misc.—Under this head collect, Labor charges, Electric Light, Collection Fees and sundry items.

Credit the Mine Physician with the total of the Doctor column.

Credit individuals with Board collected as per board bills.

Credit Store with collections as per Store column, post collection fee and assignment charges against this in the sundry column.

Extend Earnings columns, total and prove.

Extend Deductions, total and prove.

Extend Amounts due, total and prove.

When the Pay-roll is completed make a Summary for the month and enter in the Pay-roll as follows:

Earnings			Deductions	
	Days	Amount		Amount
Time Book,	xxxx	xxxxxx	Rent,	xxxx
Office,	xxx	xxx	Supplies,	xxx
Doctor,		xxx	Fuel,	xxx
Board,		xxx	Doctor,	xxxx
Store,		xxx	Aid Fund,	xxx
			Office Fees,	xx
Total,	xxxx	xxxxxxx	Electric Light,	xxx
			Board,	xxxx
			Store,	xxxx
			Total,	xxxx

(Envelope)

No.

In Account With
OJIBWAY MINING CO.

C.R. By	Days	
"	"	
"	"	
"	"	
"	"	
"	"	
"	"	
"	"	
DR. To Labor	Days	
"	"	
"	"	
"	"	
"	"	
"	"	
"	"	
"	"	
"	"	
"	"	
BALANCE DUE		

FIG. 60.—FORM 4.

It is well to have pay Dockets (form 4, Fig. 60) written as soon as the Pay-roll is completed.

Pay checks should be written the day before pay day, assigned accounts removed, etc. On pay day the dockets should be delivered only to the individual in whose name they are made out, on presentation on pay book with the receipt (Fig. 61) properly signed for the month in question. Dockets will not be delivered to parties other than those in

whose name they appear, only when an order to that effect properly signed and accompanied by the pay book receipt, also properly signed, is presented at the mine office.

This leaf must not be torn off by owner of Book

Received of

OJIBWAY MINING CO.

Balance Due for labor in

JANUARY, 19.....

Number

Write Name here before presenting Book at Pay-Window

.....

FIG. 61.

Distribution of Labor.—The Shift Bosses will report each day to the timekeeper, when they report their time, a distribution of labor for all their classifications except,

Captains and Shift Bosses, Miners contract,
Change House men, Selectors, Blockholders
Sprinkler, Wallers, Engine boys.

This distribution should show for each classification the number of shifts worked in each opening. To illustrate, suppose we have 20 Selectors:

1 shaft	3N-mill	4	3
1	4S	3	2
1	4N	2	4
2	3S	3	3
2	4N	4	4
Rockhouse No. 1			2
Tramming No. 1-3N-mill	4		1
Tramming No. 2-4N	4		1
			<u>20</u>

which is the total of Selectors as shown by the time book for the day in question. The same idea applies to all the other classifications of labor underground. The timekeeper will show these classifications of labor in his time book immediately following their time.

Distribution of Labor above Ground.—These classifications are as follows:

Surface
Teaming
Carpenters
Machinists

Blacksmiths
Electricians
Engineering Dept.
Masons

The distribution of the above classes of labor is made to Job Orders by Individual Returns, Fig. 63.

Engineers—may have to distribute to different plants
Firemen—seldom any distribution
Pumping—Watersupply—seldom any distribution
Rockhouse men—keep different houses separate.

Whenever any distribution is necessary for the above four classes, they will be kept in the time book.

Job Orders.—In an effort to get an efficient and comprehensive cost keeping system the job order method is used, comprising the following forms:

Form 12. Individual Returns
Form 35-A. Job Order issued to foreman
Form 35-B. Job Record, office record
Form 47. Job and Equip. Record, an index to jobs.

OJIBWAY MINING COMPANY	
MECHANICAL DEPARTMENT	
Job No. 1346	
DATE.....	
BLUE PRINT	SKETCH
Time and Supplies Must be Charged to Job Number.	
Description of Work:	
Return Duplicate when Job is finished.	
MASTER MECHANIC.	

FIG. 62.—FORM 35-A.

It is well to have the Master Mechanic or his assistant issue job orders as the majority of jobs above ground come under the supervision of the mechanical department. A Job Order will run for a month only (except that jobs covering the manufacture of supplies, will run until the job is completed). If a job is not completed at the end of the month a new job will be issued the first of the month to cover the work, etc., until completed.

Job Orders, Fig. 62, can be issued so as to get as much detail as is

required. Of course, the more detail, the more jobs it is necessary to issue and more time is required to take care of the office work in connection with the system.

A list of the job orders issued each month will be posted up in each of the shops and at the supply house for reference, this should be attended to by the timekeeper on his rounds twice a day. The Job Orders are issued in duplicate, the original going to the mine office, and the duplicate to the foreman having the work in hand.

Employees working on jobs will show on their Individual Return, the Job number and the number of hours worked on the job, this applies to as many jobs as he may work on in a day. As stated under time-keeping, these slips reach the timekeeper through the various foremen. The timekeeper will then extend opposite the various jobs the amount of money, based on the man's day rate of pay.

INDIVIDUAL RETURN		Date	
BOOK NO.		NAME	
JOB	NATURE OF WORK	HRS.	COST
This is authority for employee's time.		FOREMAN'S O. K.	

FIG. 63.—Form 12.

From the Job Order the clerk or his assistant will make out a Job Record (Fig. 64) noting the Job number, the work it covers, and will also show to what account the work is to be charged. When jobs are completed they are indexed on 5×8 cards like the following (Fig. 65). This card answers two purposes. First as an index to jobs and second to show details of Equipment. Regarding equipment the card would show the item, which might be a Motor, Boiler, Compressor, Air Drill, etc., and the details, also From whom bought, Voucher number, Cost, Freight, Handling. Charged to what account and when. To illustrate the use of the card, if we had a job to repair Compressor No. 1 and were indexing,

Description		OJIBWAY MINING CO.										Job Order No.									
		Month of										Account of									
		Month of										Month of									
		Burros	Teaming	Carpenters	Machinists	Blacksmiths	Electricians	Eng. Dgls.	Masons	Burros	Teaming	Carpenters	Machinists	Blacksmiths	Electricians	Eng. Dgls.	Masons				
		Debit	Credit	Debit	Credit	Debit	Credit	Debit	Credit	Debit	Credit	Debit	Credit	Debit	Credit	Debit	Credit				
1																					
2																					
3																					
4																					
20																					
21																					
Expense																					
Total																					
Expenses																					
Supplies																					
Fuel																					
Total																					
Amount																					

FIG. 64.—FORM 35-B.

turn to Compressor No. 1 card in the file, post the job number, the month and the cost of the job.

All Equipment should be indexed on these cards for ready reference.

The Job Records are made up at the end of the month, and as soon as the books are balanced and cost sheets are made out the shop expense and supplies can be posted to the Job Records to make them complete before indexing. Before the books can be made up it is necessary to transfer the jobs to Division of Labor sheets (a sheet for each shop) these sheets have the following headings:

ACCOUNT NUMBER, ACCOUNT, TIME, TOTAL COST, LABOR, EXPENSE,
JOB No., REMARKS.

Job and Equipment Record		Subject				No.					
From		Description									
Voucher											
Cost		Chgd. to									
Frt.		Date									
Mdl.		Chgd. to									
Total		Date									
Job	Date		Amt.	Job	Date		Amt.	Job	Date		Amt.

FIG. 65.—FORM 47.

First enter the Account number, then the Account to which the job is to be charged, then the Time, next the Labor, Job number, and last under Remarks state what the work was, as Sharpening Drills for No. 1 shaft.

When all the Labor sheets are made out we are now ready to close the accounts and find the expense to apportion against the different jobs. The expenses of the different departments are apportioned to the jobs of that department according to the amount of the labor charge.

Close out the accounts in the following order, Surface, Teaming, Carpenters, Machinists, Blacksmiths, Electricians, Engineering Dept. and Masons. From these labor sheets post the expense to the different job records for the month, and from the Supply records, the Supplies and the Job Records will be complete.

Supply Department. The Purchase of Supplies.—To facilitate the ordering of supplies the heads of the various departments are furnished with Department Requisitions, form 14-A, Fig. 66, as shown below.

The heads of departments will order supplies on these forms for specific jobs, and only such material as is not carried regularly in stock in the warehouse. They must be signed by the foreman issuing the same and turned over to the Mine Clerk; they will also be approved by the Superintendent before being ordered by the clerk.

Requisitions on Purchasing Agent.—These requisitions (form 2, Fig. 67) are made out in duplicate by the Mine Clerk, either for the purpose of filling depleted warehouse stock, or specific jobs as per Department Requisitions, and must have the approval of the Superintendent before going to the Purchasing Agent. If supplies are ordered from a Department Requisition, its number should be noted, also the foreman's initials at the top as reference. The original copy goes to the purchasing agent and the duplicate on file.

Form 14-3 M-1-10					No.
Order for					
From			Order No.		
.....			Date		
Amt.	Req.	Description	List	Dis.	Net
Ship					

FIG. 68.—FORM 14-B.

Office Orders.—To handle the work in the purchasing office to the best advantage, the purchasing agent makes out from the Requisition, Office Orders (form 14-B, Fig. 68) which are turned over to the stenographer to execute. The Requisition number is shown on the Office Order for reference.

Purchase Orders.—These orders (form 1, Fig. 69) are made out in triplicate by the stenographer, from Office Orders. Original copy goes to the Vendor, Duplicate copy to the files, Triplicate copy to the mine office.

Form 1-11-' 10-1000

OFFICE OF THE
OJIBWAY MINING COMPANY
L. L. HUBBARD, PRESIDENT
A. FORMIS, SUPERINTENDENT
W. H. CHARLTON, CLERK
MINE ADDRESS: OJIBWAY, MICH.

Original Order No.

Please note our order number on each invoice.

To Houghton, Mich., 191

Please furnish the Ojibway Mining Co., the following material, viz., and send Invoices in Duplicate with Bill of Lading to W. H. Charlton, Clerk, Houghton, Michigan.

Amount	Description	List	Discount	

Ship via { Ojibway Mining Company,

Mark Packages for { Ojibway Mining Company By Clerk.
Ojibway, Keweenaw Co., Mich.

FIG. 69.—FORM 1.

Freight Received Record.—All freight and express received at the mine will be entered in this book (Fig. 70). Freight bills must not be receipted by the supply clerk unless material called for is received and in good order. In the event of material received, being damaged, a notation to that effect must be made on the freight bill, also in the Freight Received Record, and the same reported to the mine clerk. Endorse on each freight bill the purchase order number that is effected. In the case of shortage or damaged material, this should be noted on the freight bill, also see that the R. R. agent is advised as well as the mine clerk. Make a notation in the Freight Received Record in case of short or damaged goods.

The numbers representing the different classes of supplies. Each invoice is checked off against the Purchase Order. The items on the order being checked off and the price noted thereon, also the date of the invoice, terms of payment and the F. O. B. point. The price should now be checked either against quotation received or prices previously paid for the same goods. Extensions and footings must be verified and cash discounts figured. All invoices after being checked should be entered on the Price Record cards (form 8, Fig. 72). A separate card being used for each item or kind of article purchased, Fig. 72, form 8-5×8.

Article								Unit_____Wt._____Class._____	
DATE	FIRM	ORDER	QUANTITY	PRICE	DISCOUNT	TERMS	F.O.B.	REMARKS	

FIG. 72.—FORM 8.

These cards furnish a complete record to the Purchasing Agent of prices paid and quantities purchased.

Invoices should be forwarded to the mine office each day, and when received by the clerk, the duplicate placed on file and the original turned over to the supply clerk.

The supply clerk will check the invoices against the triplicate copy of Purchase Order. When material received is checked off, he will also show against each item on the invoice, its proper proportion of the freight charges on the shipment, and also to each item 5 per cent. of its cost to cover the expense of handling. The supply clerk will O. K. all invoices for receipt of material and they will have to be approved by the Superintendent before being paid.

Cash discounts should be taken in every instance. Pay all invoices (except discounted ones) on the 15th of the month following receipt of goods or performance of services.

Stock Record Cards.—For the purpose of keeping an accurate account at the mine of all supplies purchased and also used, form 7, Fig. 73, is an example of the card system used. The supply clerk will keep a separate card for each article or kind of material bought. From each invoice received each item will be entered on its proper card, showing date of invoice, Purchase order number, Quantity, Invoice cost, Handling, Freight, and Total Cost. The price at which articles will be charged out, is arrived at by dividing the total cost by the quantity received. All supplies charged out will be entered on the proper cards by the supply

Ojibway Mining Company		SUPPLY ORDER.....191	
SUPPLY CLERK:		<i>Deliver the following material to.....</i>	
Amount Ordered		Value	Chargeable to
<i>Use for charges against one account only</i> <i>Foreman</i> <i>This requisition, properly signed, must be filed in the Clerk's office.</i>			

FIG. 75.—FORM 3.

Concrete work is an instance where lumber is used for forms and is removed when the concrete is set. A large part of this lumber is in condition to be used again for other purposes and credit should be given the job it was charged to, and the lumber charged back into the supply account at such a price as it would be worth in future work. They are handled the same as Supply Orders.

OJIBWAY MINING COMPANY		CREDIT SLIP		No.....
SUPPLY CLERK:		.....190		
Amount		Value	Credit	
<i>Charge to.....</i> <i>Foreman</i> <i>This requisition, properly signed, must be filed in the Clerk's office.</i>				

FIG. 76.—FORM 38.

are charged, and the amount of supplies and fuel charged, subdivided into the various classifications. The classification columns are totaled, and then cross-footed. The totals of the classification columns are posted as credits to the Supply Accounts, and the charges to the proper account in the ledger. See journal entry No. 2.

Claims for overcharge, loss, or damage of goods in transit should be made promptly by the Mine Clerk. For this purpose use form No. 33 (Fig. 78).

CLAIM FOR OVERCHARGES AND LOSS OR DAMAGE.

FIG. 78.—FORM 33.

All claims should be made out in duplicate, retaining a copy for reference until the matter is adjusted. The claim should receive the same number as the Purchase order effected.

Rental of Equipment.—The company will at times rent equipment, such as portable hoists, boilers, derricks, pumps, etc. To properly handle the expense and rentals in cases of this kind the following rules will be observed. Any expense incurred for overhauling and repairing also loading on cars any equipment for rental to outside parties will be charged to surface expense. The renting parties will pay freight both ways on any equipment rented. All rentals received will be credited to surface expense.

As a proper rate of rent is somewhat hard to determine, the following rule will be helpful. From the first cost of the equipment in question take the accepted yearly per cent. of depreciation and divide by 12 to get the monthly rental. The result of this rule can be used as a minimum

**OJIBWAY MINING COMPANY
OJIBWAY, MICH.**

No.

DAILY REPORT

For the 24 hours beginning at 7 a. m. 19....

ROCK HOISTED				SHIPPED		
	Good	Waste	Total	Rock		Mass
Skips					Cars	
Tons					Tons	

Coal UsedTons Wood Used.....

DRILLS AT WORK

Sinking 1	Sinking 2	Drifting	Stoping	Raises	Winzes	Other

MEN AT WORK

Surface Department		Underground Department	
Surface Foreman		Captain	
" Labor		Shift Bosses	
Watchman		Trammer Bosses	
Janitor		Miners	
Carpenter Foreman		Drifting	
Carpenters		Cross-cutting	
Master Mechanic		Drift on Pillars	
Machinists		Drift Stoping	
Blacksmiths		Stoping	
Masons		Blasting Side	
Electricians		Raises	
Engineering Dept.		Winzes	
		Sinking	
Engineers		Timbermen	
Firemen		Trammers	
Pumpmen		Muckers	
		Landers	
Rock House		Waller	
Foremen		Pumpmen	
Laborers		Pipemen	
Landers		Pony Boys	
Clerk and Assistant, Office		Drill Boys	
Timekeeper		Dry Men	
Supply Clerk			
		Total Underground	
		Add Surface	
		Total	

Teams
Co. Teams

.....Timekeeper.

FIG. 79.—FORM 15.

rate to which should be added an amount sufficiently large to cover the cost of loading and unloading.

Reports.—A Daily Report (form 15, Fig. 79) is made out each day by the timekeeper and sent to the Superintendent. This report shows the men at work under the different labor classifications, the Drill at work, Fuel used, and Rock hoisted and shipped.

No.		
OJIBWAY MINING COMPANY		
ACCIDENT REPORT		
1. Name of Person Injured Shaft No. Pay Book		
2. Kind of work in which he was employed and where working at time of accident		
3. Who was in immediate charge of the work?		
4. Day and hour when accident occurred M 19		
5. Were you present? Give your position with reference to person injured		
6. Names and addresses of all witnesses and persons in vicinity whether employees or not:		
Name	Occupation	P. O. Address
7. Statements of witnesses		
8. Statement of remarks of injured person. Does he blame any other than himself?		
Reported by		Occupation
Dated at		If Superintendent, Mining Captain, Foreman, Shift Boss or witness, so state.

FIG. 80.—FORM 37.

Accident Reports.—In any case where an accident occurs to any employee of the company while performing his duties, an Accident report (form 37, Fig. 80) must be made out in duplicate by the head of the department in which the injured man is employed. This report must give the fullest possible details regarding the accident, statement of witnesses, etc. The original copy goes to the Supt. and the duplicate to the Mine clerk.

Development Report.—The progress of work underground for the month is reported by the Engineering Dept (Fig. 81). This report is a cumulative one for the year, being added to each month and furnished as a blueprint. A copy goes to the Superintendent and one to the Mine clerk, for use in making up the cost sheets.

Progress measurements underground are made by the Engineering Department jointly with the Mine Captain.

This report will show the Lineal Feet, Cubic Feet, and Tons broken for each active opening during the month.

OJIBWAY MINING COMPANY ————— DEVELOPMENT 1909-10																							
SHAFT — SINKING						SHAFT — PLATS						CROSSCUTTING						DRIFTING					
1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
Feet	Feet	Feet	Feet	Feet	Feet	Feet	Feet	Feet	Feet	Feet	Feet	Feet	Feet	Feet	Feet	Feet	Feet	Feet	Feet	Feet	Feet	Feet	Feet
May																							
June																							

FIG. 81.

Nationality Report.—(Form 45, Fig. 82). A report showing the Nationality of the various employees of the company will be made out by the Mine clerk from the Pedigree cards quarterly, April 1st, July 1st, October 1st, and January 1st. One copy goes to the General Manager and one to the Superintendent.

Comparative Cost Statement.—This report is made out after the cost sheet is completed and forwarded to the Superintendent.

Cost Sheets (Figs. 84 to 97 inclusive).—The Cost Sheets should be made up as soon after the first of the month as possible. Send one copy to the General Manager and one copy to the Superintendent.

The Mine Captain should be furnished with a copy of the Stopping sheet and also the Development sheet as soon as completed, the Master Mechanic with a copy of the Machine Shop and the Blacksmith Shop accounts, the Carpenter foreman with a copy of the Carpenter account, the Surface foreman with a copy of the Co. Team Account, Surface Account and Teaming Account.

[illegible]

FIG. 82.—FORM 45.

The Stamp Mill Superintendent should be furnished with a copy of the cost sheet covering Mill operations.

In making up the Cost Sheet, Figs. 84, 88, 89, 90, 91, 92 are used as Journal vouchers, the debits and credits being posted direct to the ledgers. Skeleton entries are made in the Journal to cover the total of each sheet. Fig. 84 is made up first, a distribution of labor as shown by the time books, and posted to the ledger. Figs. 90, 91, 92 are made up together, this is necessary as the accounts are interwoven. Figs. 88 and 89 are made up together, and then the balance of the sheets follow.

The same form sheet as Fig. 94 is used for mining expense.

COMPARATIVE COSTS				Month of	
Total Men employed.....		Men employed underground			
	Amount	Total cost per man	Cost per man U. G.		Total Expense
Surface	Surface accounts	\$.....
Office		
Incidental		
Transportation		
Stamping		
Miners labor	U. G. accounts	\$.....
Miners supplies		
Compressor		
Air Lines		
Power Drills		
Gen. U. G. Expense		
Pumping U. G.		
Timbering		
Tramming		
U. G. Cars		
U. G. Tracks		
Hoisting		
Rock house	U. G. accounts	\$.....
Construction	Construction	\$.....
				Total Expenditure	\$.....

$\frac{\text{Total Expenditure}}{\text{Total Men}} = \$..... \text{ per month.}$	$\frac{\text{Total Expenditure}}{\text{Men Underground}} = \$..... \text{ per month.}$
----------------------------------------------------------------------------------	----------------------------------------------------------------------------------------

FIG. 83.

Summary of Labor as Per Pay Roll. Month of																			
		MINERS		TEAMERS		ALUMINUM ELECTROLYSIS		THERMITE		MISC.		REPAIRS		OFFICE		TOTAL		Ledges	Folds
		Days	Amount	Days	Amount	Days	Amount	Days	Amount	Days	Amount	Days	Amount	Days	Amount	Days	Amount		
7-1	Elect No. 1																		
7-2	Elect No. 2																		
8-1	Elect No. 1																		
8-2	Elect No. 2																		
11	Surfmen																		
12-1	Office, Mine																		
12-2	Office, Houghton																		
0-1	Tramming																		
0-2	Carpenters																		
0-3	Blacksmiths																		
0-4	Blacksmiths																		
0-5	Electricians																		
0-6	Eng. Dept.																		
0-7	Miscellaneous																		
0-10	Steam Plant No. 1																		
0-14	Electric Light & Power																		
0-15	Compressor																		
0-17	Force Drills																		
0-18	Water Supply																		
0-19	Hoisting System																		
0-20	Boiler																		
37	Fuel																		
13-1	Explosives																		
23	Oil Fuel																		

Fig. 84.

[illegible]

Fig. 88.

[illegible]

Fig. 88.

[illegible]

Fig. 90.

Closed Accounts.....Debits. Month of																			
STEAM PLANTS		STEAM PLANTS		ELEC LIGHT & POW.		WATER SUPPLY		HEATING SYSTEM		CO TEAM ACCOUNT		RENTS		CLEARING LAND		HIGHWAYS		TOTAL	
Day	Am't	Day	Am't	Day	Am't	Day	Am't	Day	Am't	Day	Am't	Day	Am't	Day	Am't	Day	Am't	Day	Am't
Premium				Lighting		Pump		Steam Plant		Day Le		Surface		Surface					
Water Supply				Water Supply		Water Supply		Water Supply		Water Supply		Water Supply		Water Supply					
Gas Light & Power				Gas Light & Power		Gas Light & Power		Gas Light & Power		Gas Light & Power		Gas Light & Power		Gas Light & Power					
Other				Other		Other		Other		Other		Other		Other					
Other Supplies				Other Supplies		Other Supplies		Other Supplies		Other Supplies		Other Supplies		Other Supplies					
Other Expense				Other Expense		Other Expense		Other Expense		Other Expense		Other Expense		Other Expense					
Surface				Surface		Surface		Surface		Surface		Surface		Surface					
Traveling				Traveling		Traveling		Traveling		Traveling		Traveling		Traveling					
Machinery				Machinery		Machinery		Machinery		Machinery		Machinery		Machinery					
Structure				Structure		Structure		Structure		Structure		Structure		Structure					
Supplies				Supplies		Supplies		Supplies		Supplies		Supplies		Supplies					
MAINT EXP.				MAINT EXP.		MAINT EXP.		MAINT EXP.		MAINT EXP.		MAINT EXP.		MAINT EXP.					
TOTAL EXP.				TOTAL EXP.		TOTAL EXP.		TOTAL EXP.		TOTAL EXP.		TOTAL EXP.		TOTAL EXP.					
Closed Accounts Credits																			
TOTAL CREDITS																			
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					
Gas and Steam Plants				Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants		Gas and Steam Plants					

Fig. 91.

[illegible]

FIG. 92.

[illegible]

FIG. 96.

Treasurer's Account				Trial Balance, Month of _____			
				DR.		CR.	
Balance					General Expended, Treasurer		
By Treasurer's Checks					Cash	Accounts Payable	
					Mining Expense	Handry Laborers	
					Hauling	Aid Fund	
					Rock House	Hospital	
Balance					Transportation		
					Stamping		
					Explosion		
					Office		
					Incidental		
					Depreciation		
					Construction		
					Development		
					Fuel		
					Supplies		
					Yours Unpaid		
					Deferred Liabilities		
					Accounts Receivable		
					Portable Machinery and Equipment		
Cash Account							
Balance on Hand							
Checks from Treasurer or others							
Checks Received							
Payments							
Handry Laborers							
Balance							
Balance as follows: Direct Bank							
Drawings							
Memorandum Bank Account							
Direct Bank Statement							
Direct Bank Balance							
Bank Balance							

FIG. 97.

CHAPTER III

MINING COPPER ORE.

ACCOUNTING FEATURES OF THE UTAH CONSOLIDATED MINING COMPANY

In the Bingham Mining District of Utah, the ore bodies are found as irregular replacements in limestone.

The ores of the district contain values in Copper, Gold, Silver, Lead and Zinc.

At the present time the commercial activity of the camp is centered on the Copper-Iron Sulphide ores mainly, with Lead-Silver Sulphides receiving second consideration.

The Highland Boy mine of the company is opened with five tunnels, driven into the mountain at as many levels, along the strike of the outcrop. These tunnels are connected by both vertical and inclined shafts, equipped with ladderways and ore chutes, to facilitate underground operations.

Drifts and Cross-cuts are runs into the ore bodies at convenient places from the different tunnels. The ore is broken down in the stopes with the aid of Machine Drills actuated by steam power. The ore is then chuted down to the lowest tunnel level and loaded into tram cars to be run out to the Head-House in trains of ten cars each, where it is loaded into the buckets of an aerial tram for transportation about two miles down the canyon to the railroad, to be shipped to the smelter for treatment.

The Utah Consolidated Mining Company uses the graphic system of recording data. This graphic method soon indicates the points that must be specially investigated and as a consequence the use of graphic methods has been attended by a steady increase in the amount of detailed information gathered.

While the system is quite comprehensive and takes in many ramifications of the work, as will be seen when the details are given, still the introduction has been so timed that the men gradually accustomed themselves to the system and the extensions have been so logical that no trouble has arisen. Besides, while the work as will be seen covers much detail, the gathering of the detailed information and the methods of recording it in tables have been so simplified that the plotting and tabulating is done by two men who keep up the details of the geology in the stopes as well as planning and looking after all development work and inspecting the principal stopes each day for changes in geology. In

a mine consisting of a series of irregular ore shoots in a fractured and dislocated country the amount of geological work is necessarily quite large.

Of course this matter of keeping track of details can be carried to an extreme, and might possibly become more of a detriment than an aid, were it not that the graphic method soon indicated the important points to watch in each operation and what details may well be omitted as the system is extended.

In order to keep the graphic records it is necessary for several men to collect the data that is used in preparing them. To render this easier and to simplify the work as well as to have the records uniform, practically everything is recorded on printed forms.

MINE LEDGERS—OPERATING ACCOUNTS

Expense Accounts	Distributed Accounts	
	Closed Accounts	Shop Accounts
Exploring	Boilers	Machine Shop
Development	Compressor	Blacksmith Shop
Shafts and Tunnels	Electric Lights	Carpenter Shop
Stoping	Heating	
Tramming	Fuel	
Hoisting	Explosives	
Pumping	Lumber and Timber	
Timbering	Teaming Timber	
Cars and Tracks	Supplies	
Operating Tramway	Surface Waste	
New Tramway	General Office	
Machinery		
Laboratory and Eng. Dept.		
Surface Expense		
Buildings and Fixtures		
General Expense		

Exploring.—This account is intended to cover all cost, including labor and supplies incident to exploring new ground.

Development.—This account is intended to cover all cost including labor and supplies incident to the development of known ore bodies.

Shafts and Tunnels.—This account is intended to cover all cost, including labor and supplies, in the sinking of new shafts and the driving of new drifts.

Stoping.—This account is intended to cover the total cost including labor and supplies of breaking ore in stopes.

Tramming.—This account is intended to cover all cost including labor, supplies and power, for tramming by hand and by power.

Hoisting.—This account is intended to cover all cost including labor, supplies and power, to operate and maintain both engine houses, hoists, pulley stands, etc.

Pumping.—This account is intended to cover all cost including labor supplies and power, to operate and maintain all pumps and water lines underground.

Timbering.—This account is intended to cover all cost of handling, framing and placing in the mine all timber used underground. It does not include the cost of the timber used.

Cars and Tracks.—This account is intended to cover the cost and installation of new cars and permanent track, but does not include the cost of replacing old cars with new ones.

Operating Tramway.—This account is intended to cover all cost including labor and supplies of operating and maintaining the tramway.

New Tramway.—This account is intended to cover all cost including labor and supplies of building new tramways and trestles, but not repairs to old ones.

Machinery.—This account is intended to cover all cost including labor and supplies to cover the purchase and installation of new machinery.

Laboratory and Eng. Dept.—This account is intended to cover all cost including labor and supplies for running the laboratory and doing all engineering work.

Surface Expense.—This account is intended to cover all cost including labor and supplies of odd jobs about the property that cannot legitimately be charged to other operating accounts.

Buildings and Fixtures.—This account is intended to cover all cost of new buildings and fixtures, but does not include the upkeep of old buildings.

General Expense.—This account is intended to cover all cost of odd jobs underground.

Boilers.—This account is intended to cover the cost of operating and maintaining the boiler plant. It is closed out each month to the various accounts benefited on a basis of horse power used.

Compressor.—This account is intended to cover the cost of operating and maintaining the compressor plant. It is closed out each month to the various accounts benefited on a basis of quantity of air used.

Electric Lights.—This account is intended to cover the cost of operating and maintaining the electric generating plant. It is closed out to the various accounts benefited on a basis of current used.

Heating.—This account is intended to cover all cost of operating and

maintaining the heating plant. It is closed out each month to the various accounts benefited.

Fuel.—This account is intended to cover all cost of coal including freight and unloading charges. It is closed out to the accounts benefited on a basis of tons used.

Explosives.—This account is intended to cover the cost of explosives and is closed out each month on a basis of power used.

Lumber and Timber.—This account is intended to cover the cost of Lumber and Timber also wedges and mine ladders used. It is closed out each month to the various accounts benefited according to the cost of supplies used.

Teaming Timber.—This account is intended to cover the cost of teaming timber to the mine shafts. Labor charges only. It is closed out each month to the various accounts benefited on a basis of supplies used.

Supplies.—This account is intended to cover the cost of all supplies used not otherwise provided for and is closed out each month to the various accounts benefited according to the cost of supplies used.

Surface Waste.—This account is intended to cover all cost of filling stopes from surface waste. The whole account is closed into stoping.

General Office.—This account is intended to cover all cost and expense covering the Office and Superintendence.

All these accounts are further itemized; for instance, the Stopping account is subdivided as follows: 1-B Rand parts, 3-B Rand parts, 2 1/4 in. Rand parts, 2 1/2 in. Rand parts, 0-D Rand parts, total of all the above supplies. These are apportioned from the storehouse account. Powder 1 1/2 in. 30 per cent., 1 1/4 in. 40 per cent., and 1 in. 30 per cent., fuse, caps, all are apportioned from the powder account. Next comes lumber and timber, portion used in stopes. Then comes the shops and compressor items, under which are charged the proportion from these accounts. Timbering and Surface Waste items cover the cost of putting in timbers and filling the stopes with surface waste, respectively, and are charged directly to stoping and are not distributed accounts.

The total tons mined and the total cost of stoping are figured, and then from these the cost per ton calculated.

Tonnage and Labor Chart.—The most important graphic record is the tonnage and labor chart which is posted in the main office where every one can see it and where it is studied by the shift bosses, the foremen and the other mine officials. On this labor chart in plotting the tonnage a scale of 100 tons to an inch vertically is used, while the days are plotted at intervals of an inch. This plotting is done on 10 scale paper. This scale is good for the Highland Boy Mine, where the tonnage for a day does not fluctuate more than 200 tons. A curve is plotted for the day shift tonnage and also one for the night shift, then the total tonnage for

the two shifts is plotted and also the total tonnage sent over the tramway. This tramway tonnage, as has been said before, is the most accurate of all tonnages. The tonnage mined is plotted from the estimated weight of a car of ore and the number of cars sent out by that shift. At first there were large variations between the mine tonnage and the tramway tonnage. Now the mine tonnage and the tramway tonnage are quite close together, rarely differing more than 50 tons in a daily output of 800 tons. The fact that this report made the men load the cars full has more than paid for the trouble in keeping the reports. Pay day and delays are shown by the corresponding sags in the tonnage lines.

Below the tonnage lines and on the same chart, are plotted the number of machines working each day. In doing this a vertical scale of five machines to the inch is used. Curves to represent the total number of machines in use, the machines in ore and the machines on waste are plotted. Below this are plotted the labor figures. The scale used is ten men to the inch. Curves are plotted for the total men employed and the total men employed underground. At the bottom is plotted the tons per man curve. These are on a scale of $1/2$ ton to an inch vertically. One curve shows the tons mined per man underground and another the tons mined per man employed about the mine both above and below ground. A scale of one ton to an inch was tried, but this was found to be too small a scale to show variation sufficiently striking.

On this tonnage and labor chart the most important figures in mining are clearly shown so that every one can readily see how efficient the work at the mine is.

Probably there is no better way to get cheap costs than to keep such a labor chart. It shows the efficiency in a department which includes 60 per cent. of the total cost of mining. There is only one other curve which might well be added at square set and stull timbered mines. This is a curve showing the number of men on the timber gang. Probably there is no work about a mine where more loafing is done than on the timber gang.

Such a curve in square set mining would also show whether the filling was being kept up with the stoping, for when it lagged behind, the timberman curve would mount as bulkheads became necessary.

Other Graphic Records.—In a number 376 Keuffel and Esser cross-section book, graphic records of most of the principal items in the accounts are kept. These include Cost per ton, Amount of the straight accounts, Distributed accounts, Actual total tonnage for each month, Actual average tonnage for each day for each month, Actual average tons mined per day per man employed, The same per man underground, Average number of laborers of each class per day for the month, The average of the total men employed per day for the month, the same figure for

Miscellaneous labor and also for Underground labor. Other curves are plotted for the average number of machines in ore, in waste, and the average number of all machines drilling.

In order to check the mine assaying and sampling, curves are plotted for the assays and analysis of the smelter pulp, ore bin samples (grab samples from tram buckets), and the average of all face samples. These generally check quite closely. The sum total of the net debits is plotted and also curves showing the cost per hole drilled by machines, cost per shift, cost per machine, holes drilled per shift, and other data from the monthly machine drill reports.

From these curves by comparing them with other months the officials can tell at a glance how the work in different departments compares with the work for other months. The manager can see at a glance exactly what part of the work needs watching and in case of any extraordinary figures can tell exactly where to look for the disconcerting data without wading through a whole mass of figures and reports. The graphic method of recording the different data increases the value of the cost and data keeping work fully twofold and probably no money spent by the company brings in, of course indirectly, greater returns than that spent in plotting the different data.

Blasting Report.—At the mine special provision is made underground to safeguard the men, especially from blasting accidents which, after falls of ground, are the most numerous accidents in metal mines. This Blasting Report (Fig. 112) shows the number of missed holes and their position while a blue print report, on which is marked the places that are dangerous, owing to approaching work, is also used. The headings of this report are given in an accompanying form.

Posted throughout the mine at these places are white painted sign boards on which in black letters is the warning "Dangerous from approaching working." While many of the workmen are foreigners who cannot read English, they soon find out the meaning of these white signs. Possibly a death head and cross bones might give a more vivid warning to any one whether he could read the sign or not.

All development and exploratory work at the Highland Boy is contracted that can be. Often by placing the price just high enough so that the machine helpers will have to aid in running the cars in order that the men can make good wages, the cost of the work can be made considerably less than by days pay, for the machine helper on days pay will only tend chuck and an extra mucker would have to be paid.

Contract Curves.—In order to facilitate the setting of contract prices and to aid in judging whether contract work will pay compared with days pay these curves have been worked out. These curves are plotted in No. 376 K. and E. cross-section books in which the paper is ruled to

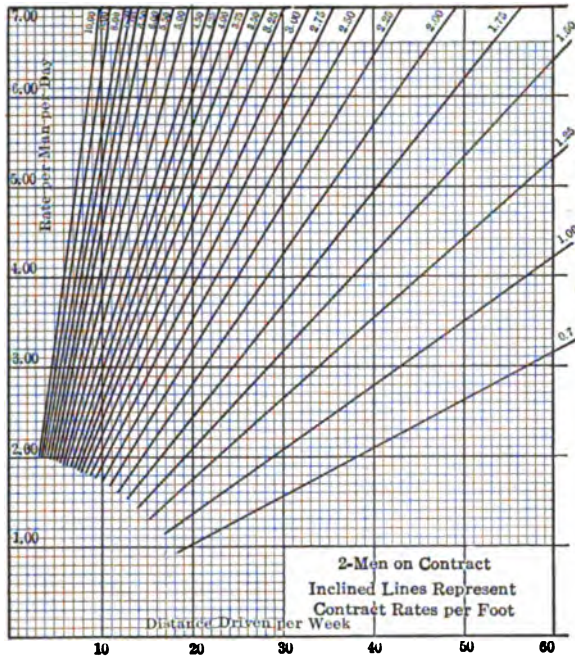


FIG. 98.

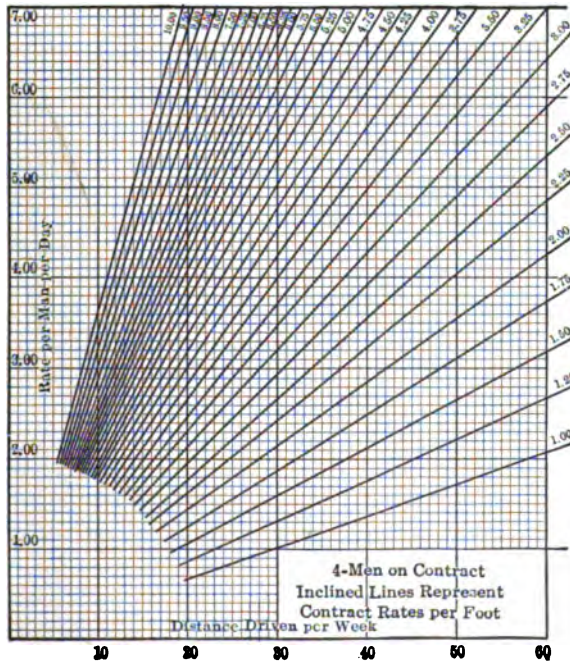


FIG. 99.

tenths. The first set that applies to contract work are applicable to any camp, but those that apply to the days pay work of course are only applicable to camps where the Bingham scale of wages are paid. Consequently only two of the curves are shown, Figs. 98 and 99.

On the contract labor chart the scale is \$1.00 to an inch vertically, and 10 ft. to an inch horizontally. The horizontal distance represents the number of feet driven in a week, while the vertical scale represents the amount of money each man on the contract is earning a day. In

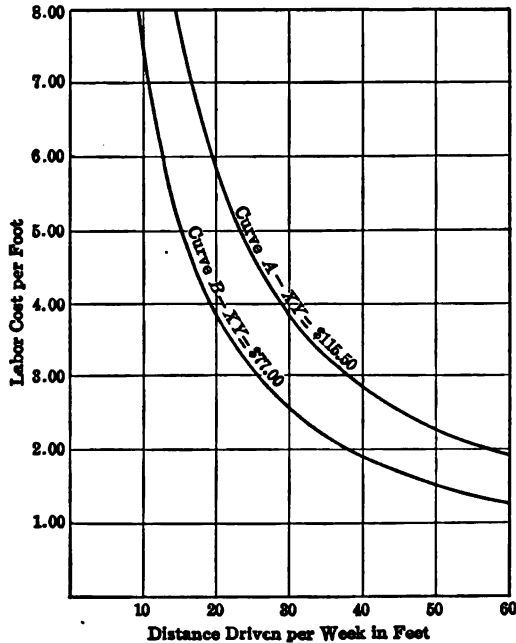


FIG. 100.

plotting these curves we have the equation that $ny = mx$, where y is the wage earned by each man a day, x is number of feet driven in a week, m is a constant, the price paid per foot, and n is the number of man shifts worked during a week. This equation is of the first degree and is therefore represented by a straight line.

Consequently in plotting the different lines on these diagrams the greatest distance that is represented is assumed to be the distance driven. This distance and the price paid per foot are multiplied together and then divided by seven times the number of men working on the contract. This gives the wage that each man would earn each day had that distance been driven. Upon plotting this rate as an ordinate, or vertical distance, and an assumed distance driven a week as abscissa, or

horizontal distance, and connecting the point thus obtained with the origin by a straight line, you have a curve which represents all the conditions when that rate per foot is paid.

This curve is useful in many ways. It can be used to tell at a glance what the men are earning from the rate of progress that they are making. Or in setting the contract it can be used to fix the price per foot when one decided how much the men should drive or raise in a week in that rock and what wage the men should be allowed to make a day.

The Pay Day Curves.—The pay day curves are plotted with the cost of labor per foot as verticals or ordinates and the distance driven per week as horizontals or abscissæ. The formula for these curves is $XY = M$, where M is the constant, representing the wages earned in a week by the crew in question, Y is the cost of labor per foot and X is the distance in feet driven per week. This equation is that of a parabola, Fig. 100.

The curve is most easily plotted by means of the slide rule and dividing the constant sum by either the assumed distance driven per week, or the assumed cost of labor per foot. The first is the better way as the quotient is the price per foot, and as a tenth-scale paper is used the decimals can easily be plotted. As to the two curves shown, the first XY equals \$115.50, represents the conditions when two machine men, two helpers and two muckers are working in a drift on the two shifts. It is figured as follows:

2 Machine men	@\$3.00, 7 shifts each,	\$42.00
2 Helpers	@\$2.75, 7 shifts each,	38.50
2 Muckers	@\$2.50, 7 shifts each,	35.00
		<hr/>
		Total, \$115.00

Presuming 60 ft. to be driven a week, then the price per foot is \$1.92. The second curve, XY , equals \$77.00, represents a crew of two machine men and two muckers.

The pay day curves are useful in telling at a glance the approximate cost of the labor per foot at the rate the drift is being driven a week and whether it is better to contract the drift. You can also tell how far a contractor would have to drive at any price per foot to make a days pay. All these curves apply to any kind of lineal advance, whether it is raising, drifting or shaft sinking. The curves are great aids and have been found very useful.

Blasting Report (Form 1, Fig. 101).—At the Highland Boy mine there are two bosses on shift. These make out their reports together. One of these reports is called the Blasting Report. An accompanying form shows the different headings on this report sheet. This report is made out mainly to give information to the other shift as to the missed holes and what is required at each working place.

UTAH CONSOLIDATED MINING COMPANY. BLASTING REPORT										Date	Shift
Level	Working Place	Blasting Done on Shift				No. Missed holes reported	Ready for Timber	Ready for Track	Is the pipeman needed?	Remarks: If blasting is not done at time specified by superintendent state reason why. If blasting is done at any other time than that specified by superintendent, state why. If there has been a cave or if timbers have been showing much weight report the same in the column opposite the proper working place. Report anything in this column not covered by the others.	
		Machine Drills		Hand Work							
		Number Blasting	Time of Blasting	Men Blasting	Time of Blasting						

UTAH CONSOLIDATED MINING COMPANY. SHIFT FOREMAN REPORT										Date	Shift
Working Place	Machinists	Machine helpers	Miners	Muckers	Trammers	Timbermen	Timbermen helpers		Number cars		

UTAH CONSOLIDATED MINING COMPANY. POWDER REPORT										Date	Shift				
Receiver of Powder	Number of Machine Drill	Where Powder is to be used	Class of Work						Number of Fuses Leaked	Remarks: Enter in this column, size and amount of all powder and fuse returned to magazine, and any other information not covered by previous columns.					
			Big		Small		Hand	Blasting							
			Sticks used	Holes	Sticks used	Holes									
No.	Occupation	Level	Working Place	Sticks used	Holes	Sticks used	Holes	Sticks used	Holes	Length of Fuses in feet	3'	5'	7'	8'	Strength of powder used

Fig. 101.

Fig. 102.

Fig. 103.

In the above all drifting, cross-cutting

[illegible]

Fig. 104.

On that account the ore has to be sampled closely, in fact every set of ore mined is sampled. To do this a sampler is employed on each shift. These samples are given a running number and a tag is nailed to the cap nearest the sample. This tag is punched out of linen mapping cloth and is marked with water-proof ink. This has been found to be the best way to mark the position of the samples, although several other methods were used. Besides the running number placed on the sample bag a paper tag containing the position of the set sampled with respect to the zero set, which is carried up from floor to floor, through the stope, is also put in.

The samplers record on a Floor Map the position of the different samples. On the Assay Map the final record is made.

The assay results are also written in the shift bosses' and the foreman's pocket note books, together with the running number of the sample. They use the tag to find the position of the sample. The assay results are also recorded on large Floor Maps, and the date of the sampling is also written in each set. These Floor Maps are kept on loose leaf pages 36 in. \times 23 in. The title consists of "Utah Consolidated Mine Assay Map" with headings to designate the Level, Floor, Room, and the ore-body. On the inside end is a 4-in. margin carrying the perforations for binding, while at the outer edge is a 2 in. margin. This leaves a space $29\frac{3}{4} \times 19\frac{3}{4}$ available for the Floor Map. This is divided into squares $2\frac{1}{2}$ in. on the side and each of these squares is subdivided into 25 squares so that each set is represented by an area $1\frac{1}{2}$ in. square. The assays from the drifts, cross-cuts, and raises, which are sampled after each round is blasted are recorded on Assay cards, Fig. 107, form 7.

LEVEL No.			FLOORS OVER			LOCATION			
Date	Previously Reported	Advanced	Total	Advanced in	Copper %	Gold \$	Silver Ozs.	Block	Section

FIG. 107.—FORM 7.

Only the average of the assays for the week are recorded on these cards, but the individual assays can be obtained from the assayer's book.

On the Assay plan map only the percentage of copper is recorded as

the gold and silver contents bears a fairly constant relation to the copper in the ore. After passing through a lean place in the stope, often rich ore is again struck. In fact many new ore bodies have been found by drifting into old stopes and exploring areas marked mineralized upon the old Geological Maps and the Assay Plans. This map shows the value of the geological mapping and of the keeping of Assay Plan Maps of each floor. In case that caving were attempted all the advantages of this work would be lost, which at this mine, owing to the fact that all the limestone carries some silica, the silica contents of the ore would be so increased that much, if not all, the gain in cheapened stoping costs would be eaten up by the higher smelting charge.

As has been intimated, Geological Maps are also kept showing the geological conditions in the stopes, drifts, and raises, the dip and strike of the faults, the position of the different contacts between quartzite and limestone and of the different monzonite dikes are indicated, especially such areas as show signs of mineralization.

The Drilling Report (Form 8, Fig. 108).—Often it is desirable to know what is the assay of the ore being mined so as to regulate the grade of ore shipped in order to take the best advantage of the smelting contract. To do this the form of report called Drilling Report is used.

UTAH CONSOLIDATED MINING COMPANY DRILLING REPORT														
Date.....														
Level	Working Place	Big Machines				Small Machines				Single Jackers				Remarks
		Place Drilling	Est. Tons	% Cu.	Tons Cu.	Place Drilling	Est. tons	% Cu.	Tons Cu.	Place Working	Est. Tons	% Cu.	Tons Cu.	

FIG 108.—FORM 8.

The place where the drill is working is determined from the sampler's report, while the assay of the ore in which the drill is working is determined from the assayer's book, or else from the Assay Plan Map. The amount of ore broken is determined by estimation. For large machines in stopes 40 tons per day are used, for small machines 30 tons per day, and for hand drilling the amount of ore trammed from each opening. By these approximations the grade of ore being mined is determined and adjusted.

bins, Same from mine samples, Same from smelter pulp, per cent. iron from ore in ore bins, Same from smelter pulp, per cent. silica from ore in bins, Same from smelter pulp, Ounces Gold in ore from bins, Same from mine samples, Same from smelter pulp, Ounces Silver in ore from ore bins, Same from mine samples, Same from smelter pulp, per cent. lime in smelter pulp, per cent. Magnesium in smelter pulp, per cent. lead in smelter pulp, per cent. moisture in smelter pulp, Total misc. labor, Average of same per day, Total Underground Labor, Average of same per day, Total men employed, Average of same per day, Tons per man underground (buckets), Tons per man underground, actual, Tons per man employed (buckets), Tons per man employed, actual, Average number of machines on waste per day, Average number of machines on ore per day, Average total number of machines running per day, Advance in Drifts, Raises, etc., Average tons per day from buckets, Same from R. R. cars, Same from actual weight.

The Daily Powder Reports are kept in a K. and E. No. 376 book, the forms for the 30 per cent. and 40 per cent. dynamite occupy two pages each. The form for each grade is the same. All the data for these powder reports is obtained by compiling the powder reports from the different magazines.

PLACES WHERE THERE MAY BE DANGER FROM BLASTING NEARBY				
Approaching mine working		Will hole through at or near to		Remarks
Level	Working Place	Level	Working Place	

FIG. 112.—FORM 12.

SMELTING COPPER ORE

ACCOUNTING METHODS OF THE CALUMET AND ARIZONA MINING COMPANY

The Smelting works of the Calumet and Arizona Mining Company are located at Douglass, Arizona. The plant is equipped with six furnaces, having a capacity of 2500 tons per day and the necessary Converters to handle the furnace output. Ore from the mines averages about 84 lb. of Copper per wet ton, equal to 4.2 per cent. and also contains precious metal values.

The ore comes to the smelter in cars and is dumped in bins, the oxides and sulphides being kept separate.

The smelting is accomplished in blast furnaces, the fuel being mixed with the charge. It consists essentially of subjecting the ores mixed with suitable fluxes to make a charge, to the action of intense heat, whereby the charge is rendered fluid, the gangue combining with the flux to form a slag, while the metals combine to form a matte.

The separation of the slag and matte takes place while in a molten condition, by reason of the difference in specific gravity.

In copper smelting the valuable product from the furnace is copper "matte" when sulphide ores are treated, and "black copper" when oxide or carbonate ores are treated.

For smelting, the mixture of ores and fluxes must be of such a composition that the resulting slag will be sufficiently liquid to allow the matte to separate from the mass readily and flow freely from the furnace.

This matte is transferred from the furnaces to Converters with the aid of electric cranes, and "blown" to "Blister Copper" in the Converters. As the resulting slag from this operation contains metallic contents, it is placed back in the furnace for further treatment.

The final product of the smelter is blister copper which contains precious metal values; it is necessary to receive further treatment at a refinery to remove the precious metals before the copper is ready for commercial use.

OPERATING ACCOUNTS—SMELTER BOOKS

Expense accounts	Closed accounts	Shop accounts
General Expense	Laboratory Expense	Machine Shop
Office Expense	Boiler House Expense	Blacksmith Shop
Furnace Expense	Power House Expense	Carpenter Shop
Converter Expense	Delivering Ore and Coke	Electrical Shop
Supplies	Loading Bullion	
Coke	Briquetting Press	
Cash	Pumping	
	Mud Mill	
	Crane Expense	
	Hauling Slag	
	Repair of Buildings	
	Repair of Dwellings	
	Lighting Expense	
	Warehouse Expense	
	Electric Plant	
	Engineering	
	Ore Sampling	
	Unloading Ore	

EXPENSE ACCOUNTS

General Expense.—Charge to this account:

Watchman as per time book	Ice
Stableman as per time book	Laboratory Expense
Change room boy time book	Pumping Expense
Labor and supplies to operate	Repair of Buildings
the Change room and Stables	Repair of Dwellings
Heating	Lighting Expense
Insurance	Warehouse Expense
Line Rider as per time book	Engineering Expense
Telegrams	Sampling Ore
Telephones	Personal Injuries.
Taxes	

This account will receive credit for Dwelling and Land Rents, also unclaimed wages.

Office Expense.—Charge this account with:

Superintendent as per time book	Yard Clerk as per time book
Clerk as per time book	Janitor as per time book
Ast. Clerk as per time book	Postage and Box rent
Stenographer as per time book	Printing and Stationery
Night Time Keeper as per time book	Office Furniture and Fixtures
	Labor and supplies to operate and maintain the Office.

This account will receive credit for all commissions on collections.

DAILY SMELTER REPORT																			
TIME		BLAST FURNACES										CONVERTERS							
Period	Day	FURNACE #1		FURNACE #2		FURNACE #3		FURNACE #4		FURNACE #5		FURNACE #6		FURNACE #7		FURNACE #8		CONVERTER	
		Total	Sh.	Total	Sh.	Total	Sh.	Total	Sh.	Total	Sh.	Total	Sh.	Total	Sh.	Total	Sh.	Total	Sh.
1 A. M. Shift																			
2 P. M. Shift																			
11 P. M. Shift																			
Total																			

MAKE REPORT ALL THROUGHOUT OF FURNACES, DELAYERS, AND BLASTS
 1 A. M. Shift 2 P. M. Shift 11 P. M. Shift

FIG. 114.—FORM 28.

Daily Furnace Report.—A daily report to cover the operations of each furnace is made out in duplicate (form 33, Fig. 113). A separate report will be made out for each furnace to cover 24 hours operations. Original copy goes to the Supt. and duplicate to the Clerk.

This report is intended to show the kind of material of each charge, whether day or night shift, and the weight in pounds. The weight of the charge will also be shown in the day or night shift columns, and the bin numbers from which the charge came noted. Each charge is entered separately.

The number of Pigs tapped will be shown in the proper place, the number of Pots of Slag noted, the Fuel consumed, kind and amount, number of hours the pump runs, and the Blast furnace pressure at stated intervals.

Daily Smelter Report (Form 26, Fig. 114).—A daily report to cover the operations of all furnaces and converters is made out each day from the Daily Furnace Report. The day's operations are divided into four periods of six hours each and in this report the material going into the furnace is shown under the furnace number affected, and for the proper time period. The charges are subdivided to show from what bin number the ore came (separate bins are for the different grades of ore and the different shafts) also quantities of Lime rock, Slag, Briquettes, Matte and Coke.

GAS ANALYSIS									
Date		Place	Description	By Volume					
Date				CO ₂	O	CO	CH ₄	H	H

FIG. 116.—FORM 30.

This report gives for each furnace the quantity of material treated for each period and for 24 hours. For the Converter operations are shown the number of converter, time the blast is on and time the charge is finished, bars of copper produced and the furnace number that should be credited with the output.

Another statement showing for each converter, the time fired and the pounds of coke used is also kept.

This report as a whole gives the quantity of material treated of each kind for each furnace and as a total for all furnaces, also the output in copper for each furnace and as a total.

Monthly Furnace Report (Form 24, Fig. 115).—This report is kept for each furnace and is cumulative for the month. Information for this re-

port is taken from the Daily Smelter Reports. The report is kept in book form.

Gas Analysis Report.—This report (form 30, Fig. 116) is intended to cover the analysis of smelter gases. The results of these analysis are recorded showing date, place and description with a result of the analysis, showing the per cent. of the ingredients of the gas sample by volume.

CLOSED ACCOUNTS

Laboratory Expense.—Charge this account with:

- Chemist as per time book
- Ast. Chemist as per time book
- Labor as per time book
- All labor and supplies to operate and maintain the Laboratory.

This account is closed out to General Expense each month.

Boiler House Expense.—Charge this account with:

- Foreman as per time book
- Fireman as per time book
- Masons as per time book
- Laborers as per time book
- Fuel Oil
- All Labor and supplies to operate and maintain the Boiler plant.

This account is closed out each month to the various accounts benefited on a basis of horse power used.

Boiler-room Record.—A daily report covering the operation of the steam generating plant is made out to cover the 24 hour period (form 64, Fig. 117).

This report shows the feed water pumped to the boilers, the oil and packing used, temperature of water and gases at various points, fuel oil received and used, and information pertaining to the economical working of the plant. This report is made out by the foremen in charge on the different shifts.

Water-treatment Record.—Owing to the fact that all water for steam purposes is too hard and severe on the boilers for economic use, it is first treated to soften and purify it. The details of this treatment are recorded on a Water-treatment Report (Form 31, Fig. 118) showing date, place and quantity treated, hardness, both initial and final, chemicals used, itemized and sub-divided to show quantity and cost, total cost, etc.

This report is made out by the chemist in charge.

BOILER ROOM RECORD.									
Calumet & Arizona Smelter, Douglas, Ariz.									
Month,				Day					
Feed Pumps	7 A.M. - 3 P.M.		3 P.M. - 11 P.M.		11 P.M. - 7 A.M.		Total		
	Rev.	Gallons	Rev.	Gallons	Rev.	Gallons			
Prescott # 1									
# 2									
Total per Shift									
OIL				PACKING					
Kind	Quantity		Kind	Quantity					
	Feed Pump	Oil Pump		Feed Pump	Oil Pump				
TEMPERATURES									
Furnace Water	Well Water	Cold Well	Hot Well	Heater	Economizer				
FUEL OIL STATEMENT									
RECEIVED								Used	On Hand
Car	No.	Cap.	G.	S. M.	Glla.	Sediment	Water		
Steam Pressure								Repairs on boilers	
Boilers Working									
Boilers Idle								Repairs on pumps	
Boilers Cleaned									
Water per lb. of fuel									
Equiv. per lb. of fuel									
Equiv. per lb. of combustible									
Tons ore smelted per lb. of fuel									
Fuel per ton ore smelted									
Water per ton ore smelted									
Remarks									

FIG. 117.—FORM 64.

Date.....		WATER TREATMENT													
Plant	Amount Treated in 1000 gals.	Hardness		Chemicals						Total Chemical Cost	Cost of Chemical per 1000 gals.	Other Expense per 1000	Total Cost per 1000 gal.		
		Initial	Final	Soda		Caustic		Lime							
				Lbs.	Cost	Lbs.	Cost	Lbs.	Cost						

FIG. 118.—FORM 31.

Fuel Oil Tests.—Crude oil is used as fuel and as it is purchased on a basis of degrees Beaume and B. T. U.'s each car received is tested. All data covering oil received and tests is recorded on Fuel Oil Test Reports. (Form 32, Fig. 119.) These reports show the Date received, place, gallons, etc. Reports are made out by the chemist in charge.

Date.....		FUEL OIL TESTS						
Date Received	Shaft	Quantity in Gallons	Car Num- ber and Initials	Degrees Beaume	British Thermal Units	Dirt and Water % Vol.	Remarks	

FIG. 119.—FORM 32.

Power-house Expense.—Charge this account with:

- Engineers as per time book
- Oilers as per time book
- Pumpmen as per time book
- Boiler House Expense, proportion
- All labor and supplies to operate and maintain the plant.

This account is closed out each month to the various accounts benefited on a basis of horse-power used.

Delivering Ore and Coke Expense.—Charge this account with:

- Foreman as per time book
- Elevator man as per time book
- Charge Wheelers as per time book
- Boiler House, proportion
- All labor and supplies used to operate and maintain the service.

This account is closed out each month to Furnace Expense.

Loading Bullion Expense.—Charge this account with:

- Labor and supplies
- Boiler House proportion
- All expense to operate and maintain the service.

This account is closed out to Converter expense each month.

Briquetting Press Expense.—Charge this account with:

- Foreman as per time book
- Feeders as per time book
- Electric Plant, proportion
- All labor and supplies to operate and maintain the service.

This account is closed out each month to Furnace Expense.

Pumping Expense.—Charge this account with:

- Pumpmen as per time book
- Boiler House, proportion
- All labor and supplies to operate and maintain the service.

This account is closed out each month to General Expense.

Mud Mill Expense.—Charge this account with:

- Foreman as per time book
- Runners as per time book
- Liners and helpers as per time book
- Electric Plant, proportion
- All labor and supplies to operate and maintain the service.

This account is closed out each month to Converter Expense.

Crane Expense.—Charge this account with:

Crane men as per time book
Chasers as per time book
Electric Plant, proportion
All labor and supplies to operate and maintain the service.

This account is closed out to Converter Expense each month.

Hauling Slag Expense.—Charge this account with:

Runners and Helpers as per time book
Electric Plant, proportion
All labor and supplies to operate and maintain the service.

This account is closed out each month to Furnace Expense.

Repairs of Buildings.—Charge this account with:

Carpenters as per time book
Painters as per time book
Masons as per time book
All labor and supplies to maintain plant buildings.

This account is closed into General Expense each month.

Repairs to Dwellings.—Charge this account with:

Carpenters as per time book
Painters as per time book
Masons as per time book
All labor and supplies to maintain company Dwellings.

This account is closed into General Expense each month.

Lighting Expense.—Charge this account with:

Electric plant, proportion
All labor and supplies to operate and maintain the service.

This account is closed into General Expense each month.

Warehouse Expense.—Charge this account with:

Supply Clerk and assistant as per time book
All labor and supplies to operate and maintain the department.

This account is closed into General Expense each month.

Electric Plant Expense.—Charge this account with:

Engineers as per time book
Boiler House, proportion
All labor and supplies to operate and maintain the plant.

This account is closed out each month to the various accounts benefited on a basis of current used.

Electric Power Record.—A Daily Report (form 65, Fig. 120) covering the output of the Electric Plant is made out by the engineers in charge each shift, showing the current furnished each circuit each shift.

Form 65		ELECTRIC POWER RECORD		
		Calumet & Arizona Smelter Douglass		
Month.....	Day.....	19.....		
ALTERNATING CURRENT				
	Present	Last	Difference	Remarks
Refining Plant				
Briquetting Plant				
Incandescent Lights				
DIRECT CURRENT				
	Present	Last	Difference	Remarks
Crane circuit				
B. S. Shop				
Mach. Shop				
Cranes				
Slag Circuit				
Sampling Mill				
Electric Shop				
Slag Line				
Arc Lamps				

FIG. 120.—FORM 65.

Engineering Expense.—Charge this account with:

Engineers as per time book
All labor and supplies to operate and maintain the service.

This account is closed into General Expense each month.

Ore Sampling Expense.—Charge this account with:

Foreman as per time book
Samplers as per time book
Switching to and from sampler
All labor and supplies to operate and maintain the service.

This account is closed into General Expense each month.

Unloading Ore.—Charge this account with:

All labor and supplies to operate and maintain the service.

This account is closed into Furnace Expense each month.

SHOP ACCOUNTS

Machine Shop Expense.—Charge this account with:

Superintendent of Machinery as per time book
 Master Mechanic as per time book
 Machinists and helpers as per time book
 Electric Plant, proportion
 All labor and supplies to operate and maintain the plant.

This account is closed out each month to the various accounts benefited on a basis of labor performed.

Blacksmith Shop Expense.—Charge this account with:

Foreman as per time book
 Blacksmiths as per time book
 All labor and supplies to operate and maintain the plant.

This account is closed out each month to the various accounts benefited on a basis of labor performed.

Carpenter Shop Expense.—Charge this account with:

Foreman as per time book
 Carpenters as per time book
 All labor and supplies to operate and maintain the plant.

This account is closed out each month to the various accounts benefited on a basis of labor performed.

Electrical Shop Expense.—Charge this account with:

Foreman as per time book
 Electricians as per time book
 All labor and supplies to operate and maintain the plant.

This account is closed out each month to the various accounts benefited on a basis of labor performed.

ACCOUNTING, GENERAL STATEMENT

The detailed accounts carried on the Smelter books are subsidiary to the Smelter accounts carried on the Mine books as follows:

Cash	Operation —
Supplies	Construction.
Coke	

All supplies and material for the smelter are purchased through the Purchasing agent at the mine and all invoices of whatever nature against the smelter pass through the mine books, being charged through the Voucher Record to the Smelter Accounts effected. (The Voucher Record used is similar to that used by the Ojibway Co.)

Invoices.—All invoices are received by the company in triplicate and forwarded to the smelter clerk. They are checked as to material received etc., and entered in the stock records (form 40, Fig. 121).

CALUMET & ARIZONA SMELTER							
Expense Bill		Car		Way Bill		From	Consignor
Date	No.	No.	Ins.	No.	Ins.		

FIG. 125.

Upon the filing of an application properly signed with the company, the matter is then taken up with the parties given as reference:

In taking the matter up with the parties given as reference a regular form (No. 43, Fig. 127) is used for the purpose, the replies to the information called for on this form are made on the lower part of the sheet

Calumet & Arizona Mining Co.
Superior and Pittsburg Copper Co.

APPLICATION FOR SITUATION

For position as

1. Name in full
2. Age
3. Nationality
4. Married or single
5. If married is family here
6. Where was your last employment and when
7. By whom employed
8. To whom do you refer as to your personal character and qualifications for position as
 A
 B

In order that the may be fully informed as to my personal character and my qualifications for the positions for which I have made application I refer to each of my former employers and request and authorize each of the companies for whom I have worked to give the above named company all the information they may be in possession of whether shown by my personal record or otherwise, as to my personal character and also my qualifications for the position I have herein applied for, and the reason why I was discharged or quit their service, upon any inquiry that may be made of them or either of them by said mining company.

Dated..... Signed

Employed by.....

FIG. 126.—FORM 42.

so that both questions and answers are on one sheet and come back to the company and are filed away as reference.

All employees of the company are given numbers when they are assigned work, these numbers run from one up and do not have a continuous expansion, that is an employee having as his number ten and leaving the employ of the company would leave that number vacant so that the next man to enter the employ of the company would be assigned the number ten. The lowest vacant numbers are always given out first so that the range of numbers in use will be as low as possible, this facilitates matters greatly when making up the Pay-roll.

Calumet & Arizona Mining Co.	
<p>Dear Sir:</p> <p>Mr. has applied to this company for work as a He states he was in your employ in and refers us to you as to his personal character and competency. A reply below will greatly oblige and will be regarded as confidential. An early answer is particularly requested, as we are waiting for such reply before putting him to work.</p>	<p style="text-align: right;">Bisbee, Ariz.</p> <p style="text-align: right;">By Third Vice-President</p>
<p>Mr. Worked for us as stated Has not been in our employ</p> <p>His work was satisfactory unsatisfactory</p> <p>His character was</p>	<p style="text-align: right;">Signed</p>

FIG. 127.—FORM 43.

Time Books.—All time is kept by timekeepers both day and night; this is taken down in pocket time books, ruled for a month of 31 days; the time is transferred from these books to an office time book each day. The office time book is ruled the same as the pocket time book except that it is of a great deal larger size. In both time books the various classes of labor are segregated so that Surface laborers would be grouped together, Carpenters together, etc. At the end of the month the time is extended and the gross amount due each employee is figured and entered in the office time book. The amount due each class of labor is totaled

[illegible]

Fig. 128.

and a summary of the earnings for the month is entered in the book immediately following the time entries.

Distribution of Labor.—The timekeepers while taking the time also keep a distribution of labor; this distribution is kept in the time book and arranged so that the distribution for each class of labor will follow

No. _____				
In Account with Calumet & Arizona Mining Co. Smelter Dept.				
For _____ 19__				
CREDITS				
By _____	days	@ _____		
" _____	"	@ _____		
" _____	"	@ _____		
" _____	"	@ _____		
" _____	"	@ _____		
" _____	"	@ _____		
			NOT NEGOTIABLE	
DEBITS				
For Doctor _____				
" Store _____				
" Board _____				
" Insurance _____				
" Car Tickets _____				
" Subscription _____				
Total				
Received payment in full				
Note:— This should be signed before presenting.				

FIG. 129.

the time of that class of labor. This distribution is extended and totaled at the end of the month and checked with the time, after that it is ready for use in making up the Cost Sheet.

Pay-roll.—The time of the employees is posted direct from the office time book to the pay-roll (Fig. 128), and as it frequently happens that a man will have worked at several different jobs during the month that entitle him to different rates of wages, the pay-roll is so designed that the various classifications and earnings of an employee can be shown and

[illegible]

Fig. 130.

[illegible][illegible]

Ore in Stock.—In this book (Fig. 132) is entered all shipments received, a separate page being assigned each month to each shaft of each shipper or each shipper as the case may require. The entries in this book call for Date and kind of ore, the Bin to which it is unloaded, Lot number, if any, the Weight both Wet and Dry, per cent. and pounds of moisture, the assay and the value of the contents.

Refinery Results.—All the product of the smelter shipped to the refinery is entered in this book (Fig. 133), showing the Date shipped, Lot number Car, Bars, Weight, Assay and contents of the different metals in value. When the returns are received from the refinery, which show the Bars, weight assay and value of contents, it is entered as an offset to the shipment.

Production Statement.—At the end of each month there is made up a statement (Fig. 134) showing the production, shipments and on hand at the end of the month. The number of bars of copper, their weight and average assay, also the contents in Gold, Silver and Copper.

Cost Sheets.—The cost sheet which is made up in book form shown as Figs. 135 to 146 inclusive is made up as soon as practicable after the end of the month.

C. & A. MNG. CO. SMELTER								
Copper Statement for the Month of _____								
Description	Bars	Pounds Blister	Average Assay			Contents		
			AU	AG	CU	AU	AG	Fine Copper
On Hand								
Produced During the Month								
Total								
Shipped During the Month								
On Hand								

FIG. 134.

SUMMARY OF EXPENSE.....19.....

No. Men	Account	Cost Ton Dry Ore	Cost Pound Fine Copper	Per Cent. of Cost	Amount
	General Expense				
	Office Expense				
	Furnace Expense				
	Converter Expense				
	Total Operating Expense				
	Construction				
	Fire Clay Quarry. Silica Quarry				
	Grand Total				
	Furnace No. 1 in Operation Days of 24 Hours				
	2				
	3				
	4				
	5				
	6				
	Tons Wet Ore Treated or per Day per Furnace				
	" Dry " " " " " " " " No. 1				
	" Wet " " " " " " " " per Day (actual time) Furnace No. 1				
	2				
	3				
	4				
	5				
	6				
	" Dry " " " " " " " " No. 1				
	2				
	3				
	4				
	5				
	6				
	Pounds Blister Copper Produced or per Day				
	" Fine " " " " " " " " per Ton Dry Ore Treated				
	Tons Wet Ore Treated per Ton of Coke Consumed or %				
	" Dry " " " " " " " " or %				
	Tons Coke Consumed Furnace Converter or per Day				
	Tons Steam Coal Consumed or per Day				
	Bris Fuel Oil Consumed or " "				
	Tons Fire Clay Consumed or per Ton				
	Tons Silica Rock " or " "				
	Tons Lime Rock " or " "				
	% of Moisture in Ore Treatment, C & A S & P Cole S & P JCT				
	Average Slag Assay				
	Total Cost per Ton of Wet Ore Treated				
	Average Number of Men Employed				
	Average Rate per Day no				
	" " " " " " " " not including Office				
	Tons of Wet Ore smelted per Man or per Day				
	" Dry " " " " " " " " or				

FIG. 135.

DETAILS OF EXPENSES

GENERAL EXPENSE	Days	Rate	Amount	Amount	Total
Watchman					
Stableman					
Change room Boy					
Laborers					
Gen'l Supplies Elect.					
I and S Lumber					
P and F Oils					
Machy. Tools					
Mach. Shop Bks.					
Carpt. Elect.					
Heating					
Fire Insurance					
Line Rider					
Telegrams					
Telephoning					
Taxes					
Ice					
Laboratory Expense					
Pumping Expense					
Repair of Buildings					
" Dwellings					
Lighting Expense					
Warehouse Expense					
Engineering Expense					
Sampling Ore "					
Personal Injuries					
Total					
CREDITS, Land Rents					
Rent for Dwellings					
Unclaimed Checks Cancelled					
NET					
OFFICE EXPENSE					
Superintendent					
Clerk					
Asst. Clerk					
Stenographer					
Night Time Clerk					
Yard Clerk					
Janitor					
Gen. Supplies Elect.					
I and S Lumber					
P and F Oils					
Machy. Tools					
Mach. Shop Bks.					
Carpt. Elect.					
Postage and Box Rent					
Printing and Stationery					
Office Furniture and Fixtures					
Total					
CREDIT, Commission on Collections					
NET					
FORWARD					

FIG. 136.

DETAILS OF EXPENSE

FURNACE EXPENSE	Days	Rate	Amount	Amount	Total
General Foreman					
Foreman					
Feeders					
Tappers					
Tappers Helpers					
Slag Men					
Laborers					
Masons					
Gen. Supplies Elect.					
I and S Lumber					
P and F Oils					
Machy. Tools					
Mach. Shop Bks.					
Carpt. Elect.					
Demurrage on Coke					
Coke					
Power House for Blast					
Delivering Ore and Coke Expense					
Briquetting Press Expense					
Hauling Slag Expense					
Unloading Ore Expense					
Total					
CREDIT					
Sales Old Brass castings					
NET					
CONVERTER EXPENSE					
General Foreman					
Foreman					
Skimmers					
Punchers					
Moulders					
Masons					
Laborers					
Gen. Supplies Elect.					
I and S Lumber					
P and F Oils					
Machy. Tools					
Mach. Shop Bks.					
Carpt. Elect.					
Coke					
Power House for Blast					
Mud Mill Expense					
Crane Expense					
Loading Bullion Expense					
Loss on Silicious Ore (lining)					
Total					
Credits, Sales of Scrap Iron					
Profit on Silica Sold					
Profit on Ore Used as Lining					
NET					
TOTAL SMELTER EXPENSE					

FIG. 137.

DETAILS OF EXPENSE

LABORATORY EXPENSE	Days	Rate	Amount	Amount	Total
Chemist					
Asst. Chemist					
Laborers					
Gen. Supplies Elect.					
I and S Lumber					
P and F Oils					
Machy. Tools					
Mach. Shop Bks.					
Carpt. Elect.					
Determinations @					
Charged to General Expense					
BOILER HOUSE EXPENSE					
Foreman					
Fireman					
Asst. Fireman					
Laborers					
Masons					
Gen. Supplies Lumber					
I and S Oils					
P and F Tools					
Machy. Fuel					
Dumurrage					
Mach. Shop Bks.					
Carpt. Elect.					
Total					
Per Cent. Charged to Loading Bullion					
Per Cent. Charged to Power House Expense					
Per Cent. Chgd. to Delivering Oil and Coke					
POWER HOUSE EXPENSE					
Engineers					
Oilers					
Pumpmen					
Laborers					
Gen. Supplies Elect.					
I and S Lumber					
P and F Oils					
Machy. Tools					
Mach. Shop Bks.					
Carpt. Elect.					
Boiler House for Steam					
Total					
Per Cent. Charged to Furnace Expense					
Per Cent. Charged to Converter Expense					
Per Cent. Charged to Electric Plant					
Per Cent. Charged to Pumping Plant					
Per Cent. Charged Delivering Oil and Coke.					
Gallons Engine Oil Used per Day					
Gallons Cylinder Oil Used per Day					

FIG. 138.

DETAILS OF EXPENSE

DELIVERING ORE & COKE EXPENSE	Days	Rate	Amount	Amount	Total
Foreman					
Elevator Men					
Charge Wheelers					
Laborers					
Gen. Supplies Elect.					
I and S Lumber					
P and F Oils					
Machy. Tools					
Mach. Shop Bks.					
Carpt. Elect.					
Boiler House for Steam					
Tons Wet Ore to Furnace					
" Coke "					
" Briquettes "					
" Slag "					
" Lime Rock "					
" Delivered at per Ton					
LOADING BULLION EXPENSE					
Laborers					
Gen. Supplies Elect.					
I and S Lumber					
P and F Oils					
Machy. Tools					
Mach. Shop Bks.					
Carpt. Elect.					
Boiler House for Steam					
Loading, Tons Bullion @ per Ton					
Charged to Converter Expense					
BRIQUETTING PRESS EXPENSE					
Foreman					
Feeders					
Laborers					
Gen. Supplies Elect.					
I and S Lumber					
P and F Oils					
Machy. Tools					
Mach. Shop Bks.					
Carpt. Elect.					
Elect. Plant for Power					
For Briquetting Tons of					
Briquettes @ per Ton					
Average Copper					
Charged to Furnace Expense					

FIG. 139.

DETAILS OF EXPENSE

HAULING SLAG EXPENSE	Days	Rate	Amount	Amount	Total
Runners					
Runners Helpers					
Laborers					
Gen. Supplies	Elect.				
I and S	Lumber				
P and F	Oils				
Machy.	Tools				
Mach. Shop	Bks.				
Carpt.	Elect.				
Elect. Plant for Power					
For Hauling	Pots	Slag@	each		
Charge to Furnace Expense					
REPAIRS OF BUILDINGS					
Painters					
Laborers					
Masons					
Gen. Supplies	Elect.				
I and S	Oils				
P and F	Lumber				
Machy.	Tools				
Mach. Shop	Bks.				
Carpt.	Elect.				
Charge to General Expense					
REPAIRS OF DWELLINGS					
Painters					
Laborers					
Masons					
Gen. Supplies	Elect.				
I and S	Oils				
P and F	Lumber				
Machy.	Tools				
Mach. Shop	Bks.				
Carpt.	Elect.				
Charge to General Expense					
LIGHTING EXPENSE					
Laborers					
Gen. Supplies	Elect.				
I and S	Lumber				
P and F	Oils				
Machy.	Tools				
Mach. Shop	Bks.				
Carpt.	Elect.				
Electric Plant for Power					
Charge to General Expense					

FIG. 141.

DETAILS OF EXPENSE					
WAREHOUSE EXPENSE	Days	Rate	Amount	Amount	Total
Supply Clerk					
Asst. Supply Clerk					
Laborers					
Gen. Supplies Elect.					
I and S Lumber					
P and F Oils					
Machy. Tools					
Printing					
Mach. Shop Bks.					
Carpt. Elect.					
Charged to General Expense					
ELECTRIC PLANT EXPENSE					
Laborers					
Gen. Supplies Elect.					
I and S Lumber					
P and F Oils					
Machy. Tools					
Mach. Shop Bks.					
Carpt. Elect.					
Power House for Power					
Total					
Per Cent. Charged to Mud Mill					
Per Cent. " Crane Expense					
Per Cent. " Hauling Slag					
Per Cent. " Briquette Press Exp.					
Per Cent. " Lighting Expense					
Per Cent. " Mach. Shop Expense					
Per Cent. " Pumping					
ENGINEERING EXPENSE					
Engineers					
Laborers					
Supplies					
Mach. Shop Bks.					
Carpt. Elect.					
Charge to General Expense					
ORE SAMPLING EXPENSE					
Foreman					
Samplers					
Laborers					
Supplies					
Shops					
Switching to and from Sampler					
Charged to Sundries					
UNLOADING ORE EXPENSE					
Laborers					
Charge to Furnace Expense					

FIG. 142.

DETAILS OF EXPENSE

MACHINE SHOP EXPENSE	Days	Rate	Amount	Amount	Total
Supt. of Machinery					
Master Mechanic					
Machinists					
Machinists Helpers					
Gen. Supplies Elect.					
I and S Lumber					
P and F Oils					
Machy. Tools					
Carpt. Shop Elect.					
Bks.					
Elect. Plant for Power					
Charged to Sundries					
BLACKSMITH SHOP EXPENSE					
Foreman					
Blacksmiths					
Helpers					
Gen. Supplies Elect.					
I and S Lumber					
P and F Oils					
Machy. Tools					
Mach. Shop Elect.					
Carpt.					
Charge to Sundries					
CARPENTER SHOP EXPENSE					
Foreman					
Carpenters					
Helpers					
Gen. Supplies Elect.					
I and S Lumber					
P and F Oils					
Machy Tools					
Mach. Shop Elect.					
Bks.					
Charge to Sundries					
ELECTRICAL SHOP EXPENSE					
Foreman					
Electricians					
Helpers					
Gen. Supplies Elect.					
I and S Lumber					
P and F Oils					
Machy. Tools					
Mach. Shop Elect.					
Carpt. Bks.					
Charged to Sundries					

FIG. 143.

SUPPLY ACCOUNT

Dr.			Cr.	
		Balance 19	Smelter Expense	
		Purchases	Construction	
		Labor	Shops	
		Shops	Sales and Refunds	
		C and A Mng. Co.	Pay-roll Deductions	
		Fire Clay Quarry	C and A Mng. Co.	
		Silica Quarry	C Q Mng. Co.	
			Ore Purchases	
			Balance 19	
			General	
			I and S	
			P and F	
			Machy.	
			Elect.	
			Lumber	
			Oils	
			Tools	
			Fuel	
			Ore Purchases	
			Total	

COKE ACCOUNT

		Balance 19	Smelter Expense	
		Purchases	Refunds	
		Labor	C and A Mng. Co.	
			C Q Mng. Co.	
			Balance 19	

STATEMENT OF PAY-ROLL AND BILLS AUDITED ACCOUNTS

	Gross	Deductions	Net	
Pay-roll				
Bills Audited				

FIG. 144.

CASH ACCOUNT

Balance on hand	19			
C. & A. Mng. Co. Biabee				
Unclaimed Checks canceled				
Labor	Balance	Pay-roll		
Labor	Account	Pay-roll		
Balance on hand	19			

MEMORANDUM OF ACCOUNT

Balance as per Cash Account				
Checks Outstanding				
Balance as per Bank Statement				

STATEMENT OF ORE SMELTED

	Wet Tons	Dry Tons
C & A Ores—Oxides		
Oxide L. G.		
Sulphide		
S. & P. Ores—Cole Oxide		
Cole Sulphide		
Junct. Oxide		
Junct. Sulphide		
Hoat Oxide		
Hoat Sulphide		
Wet Tons H2O Dry tons		
Total C. & A. Ores		
Total S. & P. Ores		
Total Tons		
Average per Day		

FIG. 145.

CHAPTER IV

MINING COAL AND MAKING COKE

ACCOUNTING METHODS OF THE UTAH FUEL COMPANY

The Utah Fuel Company own the
Pleasant Valley Coal Company
Wasatch Store Company.

The Utah Fuel Company operates the
Sunnyside Mine
Somerset Mine.

The Pleasant Valley Coal Company operates the
Winter Quarters Mine
Castle Gate Mine
Clear Creek Mine
Utah Mine.

Coke is manufactured at the
Castle Gate Mine
Sunnyside Mine.

The Wasatch Store Company have stores located at the various mines which do a general mercantile business with the employees of the company.

These mines are opened by slopes, from the foot of which the main entries are driven. The coal lies on a general dip, with local variations, sometimes quite sharp but not extensive. The main entries though not driven to follow the strike are quite level, being straightened up by filling and cutting after the adjacent coal is out. Butt entries are driven from the main entry and rooms turned each way from the out butts.

The coal is broken down in the rooms and loaded in cars to be hauled to the main entry by mules. It is taken by electric locomotives there made up into trains and run to the tippie, where the coal is crushed and screened, the various grades being run into separate bins. From these bins it is loaded into railroad cars for shipment.

The coke is made from slack coal delivered from the mine and manufactured in ovens. From these ovens it is loaded directly into railroad cars for shipment to consumers.

COST OF COAL AND COKE TO THE CONSUMER

Profit and loss		Coal and Coke at Mines		Profit on Sales
Administrative		Freight		
Operating				
Coal Expense				
Coke Expense				
Earnings				
Administrative				
General Expense				
Salaries				
Law				
Rents				
Stationery, etc.				
General Exp.				
Insurance				
Taxes				
Royalties				
Depreciation				
Personal Injuries				
Prospecting				
Interest, etc.				
Rents				
Coke Expense				
Coal Used				
Superintendence and Clerks				
Engineering				
Charging Ovens				
Burning and Drawing				
Loading Coke				
Loading Cinders				
Firing Cold Ovens				
Repairs to Coke Ovens				
Repairs to Buildings				
Coke Experiments				
Incidentals				
Coal Expense				
Mining				
Hauling				
Loading				
Repairs to Cars				
Repairs to Tracks				
Electric Lights				
Entry Driving				
Rooms and Rolls				
Ventilation				
Drainage and Watering				
Timber and Props				
Dead Work				
Repairs to Buildings and Chutes				
Repairs to Machinery				
Superintendence and Clerks				
Engineering				
General Expense				
Incidentals				

NOTE.—Accounts underlined are debited with the items below them, which may be sub-accounts or direct charges. Consumer refers to dealers buying from the mines.

GENERAL OFFICE LEDGER ACCOUNTS

General ledger accounts	Accounts, auxiliary records	Closed account
1. Cost of Property 2. Lands 3. Mine Development 4. Tramways, Chutes and Trestles 5. Buildings 6. Power and Machinery 7. Cars and Tracks 8. Coke Ovens 9. Boarding House Fixtures 10. Saloon Buildings 11. Machinery for Prospecting 12. Earnings 13. Mine Expense..... 14. Coke Expense..... 15. General Expense 16. Boarding House Expenses 17. Boarding House Receipts 18. Rents 19. Insurance 20. Taxes 21. Personal Injury Claims 22. Coal Prospecting 23. Depreciation of General Plant, etc. 24. Interest, Discount and Exchange 25. Vouchers 26. Pay Rolls 27. Treasurer 28. Unclaimed Wages 29. Depreciation Account 30. Material and Supplies 31. Engineering Property 32. Pay-roll Deficiency 33. Personal Injury Fund 34. Animals Killed and Sold 35. Special Renewal Fund 36. Individuals and Companies 37. Water Supply 38. Smithing 39. Saw Mill 40. Depreciation of Animals 41. Profit and Loss	13. { 1. Expense of Mining 2. Hauling 3. Loading 4. Repairs to Cars 5. Repairs to Tracks 6. Electric Light 7. Entry Driving 8. Rooms and Rolls 9. Ventilation 10. Drainage and Watering Mine 11. Timber and Props 12. Dead Work 13. Repairs to Buildings 14. Repairs to Machinery 15. Superintendence and Clerks 16. Engineering 17. General Expense 18. Incidentals 40. Coal Used 41. Superintendence and Clerks 42. Engineering 43. Charging Ovens 44. Burning and Drawing 14. { 45. Loading Coke 46. Loading Cinders 47. Firing Cold Ovens 48. Repairs to Coke Ovens 49. Repairs to Buildings 50. Coke Experiments 51. Incidentals	Power House

GENERAL LEDGER ACCOUNTS

1. Cost of Property.—This account represents the total amount of the capital accounts for all mines of the company:

Lands	Power and Machinery
Mine Development	Cars and Tracks
Tramways, Chutes and Trestles	Coke Ovens.
Buildings	

These accounts are closed into Cost of Property each month by Journal entry.

2. Lands.—Representing the total cost of mining property, including all legal expenses in connection with acquiring the same, and any expense incurred for surveys and examinations, also preliminary prospecting of the property either before or after purchase.

This account represents the total cost of all lands owned by the company. It is closed into Cost of Property by Journal entry.

3. Mine Development.—Representing the total cost of developing all mines of the company until such time as they are placed on a producing basis except that when buildings and equipment of a permanent nature are erected or installed during the development stage, the expense thereof will be charged to the proper capital accounts.

All earnings from the sale of product during the development stage of a mine will be credited to this account. This account is closed into Cost of Property.

4. Tramways, Chutes and Trestles.—Representing the total cost of all permanent Tramways, Chutes, Trestles, Scales, Tipples, Screens, etc., for all the mines of the company. This account is closed into Cost of Property.

5. Buildings.—Representing the total cost of all permanent buildings for all mines of the company. This account is closed into Cost of Property.

6. Power and Machinery.—Representing the total cost for all mines of the company, of Machinery, Shop Tools, Power Equipment, Horses, Mules, Harness, etc. This account is closed into Cost of Property.

7. Cars and Tracks.—Representing the total cost for all mines of the company, of mine cars, coke oven larries, tracks, etc., except that when a mine is on a producing basis the maintenance of the above mentioned equipment and extensions of the track, are charged to operating expense. This account is closed into Cost of Property.

8. Coke Ovens.—Representing the cost of all ovens of the company at the different mines and the equipment of the same. This account is closed into Cost of Property.

9. Boarding House Fixtures.—Representing the total cost for all

mines of the company, of the Boarding house furniture, stoves, ranges, cooking utensils, beds and bedding, etc. This account is not intended to cover repairs and replacements of equipment which are charged to operating account of Boarding House.

10. Saloon Buildings.—Representing the cost of all buildings and the necessary fixtures which have been purchased or erected by the company for use as saloons.

11. Machinery for Prospecting.—Representing the cost of portable machinery which is used in prospecting, such as Diamond Drills, Hoists, Pumps, etc., all the above are charged to the company in general, and not to any particular mine.

12. Earnings.—This account represents the income from the sale of all Coal and Coke, and is charged with the expense of delivering Coal and Coke sold to the mines locally, also with any overcharges in price for Coal and Coke shipped. The account covers all mines of the company.

13. Mine Expense.—This account represents the total operating expenses for all Coal mine operations of the company. It is made up of the following accounts as shown by the mine records.

A. Mining	J. Drainage
B. Hauling	K. Timber and Props
C. Loading	L. Dead Work
D. Repairs to Cars	M. Repairs to Buildings and Chutes
E. Repairs to Track	N. Repairs to Machinery
F. Electric Light	O. Superintendence and Clerks
G. Entry Driving	P. Engineering
H. Rooms and Rolls	Q. General Expense
I. Ventilation	R. Incidentals

14. Coke Expense.—Representing the cost of operating the coke ovens of the company and is made up of the following accounts as shown on the mine records

A. Coal Used	G. Loading Cinders
B. Superintendence and Clerks	H. Firing Cold Ovens
C. Crushing and Elevating	I. Repairs to Coke Ovens
D. Charging Ovens	J. Repairs to Buildings
E. Burning and Drawing	K. Coke Experiments
F. Loading Coke	L. Incidentals

15. General Expense.—This account comprises the following subdivisions:

- A. **General Office, Salaries and Expenses**, covering the salaries of officers and clerks, Directors fees and expenses, office expenses, etc.
- B. **Law Expense.**—To cover the salaries and expenses of attorneys, engaged in company business and not chargeable to

some specific account. Legal expense incurred on account of Personal injuries will be charged to the Personal Injury Fund.

C. Rents.—To cover the rental of the general offices of the company.

D. Stationery and Printing.—To cover the cost of stationery, books and supplies used at the general offices of the company.

E. General Expense.—To cover advertising and such other sundry items as are not covered by the preceding accounts.

16. Boarding House Expenditures.—This account covers the cost of operating all boarding houses of the company.

17. Boarding House Receipts.—To cover all receipts for board furnished by all company boarding houses.

18. Rents.—This account represents the gross rentals from all houses owned by the company, less maintenance charges against the same.

19. Insurance.—The total amount of insurance premiums payable in each year is charged to this account. This amount is pro-rated one-twelfth each month. When the Insurance premiums are paid they are charged to Insurance account. Whenever a loss occurs by fire, a charge is made against the insurance company for the amount of loss and Property Destroyed account is credited. When the claim is settled if the full amount is not allowed, the difference is charged to an expense account.

20. Taxes.—The estimated amount of taxes payable each year is charged to this account and credited to Accrued Taxes account, pro-rated one-twelfth each month. When taxes are paid they are charged to Accrued Taxes account. Any adjustment necessary is made in charging out the final installments.

21. Personal Injury Claims.—This account is charged each month with an amount that is estimated to cover all claims for personal injuries and death from accident that are likely to occur during the year. Personal Injury Fund is credited with this amount and when settlements are made with individuals the amounts are charged to the Personal Injury Fund.

22. Prospecting.—This account is to cover all expenses incidental to the prospecting of Coal land both before and after purchasing. When lands which have been prospected are purchased the amount so expended will be charged to the cost of Lands, and credited to this account.

23. Depreciation of General Plant Account.—This account represents the amounts charged off each month and year for depreciation of property and plant, and this account is charged out to income each year, and appears on the Financial Statement each month as a charge to Income. The amounts charged to this account each month are credited to Depre-

ciation account, which remains on the books and is generally deducted from the total of the capital accounts or Cost of Property in making up the balance sheet.

24. Interest Discount and Exchange.—This account represents all interest received and paid, exchange paid and discounts taken.

25. Vouchers.—The total amount of vouchers for the month, as shown by the Abstract of Vouchers, is credited to this account, and charged to the accounts for which expenditures are made, as shown by the distribution in the Abstract of Vouchers. When Vouchers are paid, the Treasurer's account is credited and Voucher account is charged.

26. Pay-roll.—This account is credited with the gross earnings as shown by the Pay-roll Distribution, and charged with sundry pay-roll deductions, and when the net amount of the roll is paid by the Treasurer, the Pay-roll account is charged and the Treasurer is credited.

27. Treasurer.—This account is handled by the Auditor just the same as one would handle the cash account in case there was no treasurer of the company, in other words, the Treasurer is responsible for the cash, and is credited with all receipts and charged with all disbursements.

28. Unclaimed Wages.—Employees wages which are not called for on pay day (paid out), are placed to the credit of this account, and when the wages are claimed and paid out this account is charged.

29. Depreciation Account.—This account is credited each month with the amount charged to Depreciation of General Plant account, and the amounts set up to the credit of this account are usually allowed to remain on the books, and in making up the balance sheet the total of this account is deducted from the Cost of Property, before showing the same.

31. Engineering Property.—Covers all Transits, Levels, Rods, Tapes, Drawing Instruments, etc., all equipment for the engineering department.

32. Pay-roll Deficiency.—This account is intended to cover pay-roll overdrafts which are charged to this account. When the overdrafts are collected on the following month's pay-roll, this account receives credit.

33. Personal Injury Fund.—An estimated yearly amount to cover claims for personal injuries and deaths from accidents while in the company's employ is pro-rated one-twelfth each month into Personal Injury Claims and credited to this fund. When claims are paid they are charged to this account.

34. Animals Killed and Sold.—When an animal is killed or sold its value is credited to this account and charged to Hauling. Animals purchased to replace those killed or sold will be charged to this account.

35. Special Renewal Fund.—This account is credited with income from the sale of old material, scrap metal, etc. Charges to this account are for renewals to plant, etc.

36. Individuals and Companies.—Coal Sales. This account represents the accounts receivable from the sale of Coal and Coke, the detail accounts for which are kept in Individuals and Companies Coal Sales Ledger. The General Ledger carrying only the controlling account or total amount. Individuals and Companies Bills Collectable cover accounts receivable as per Bills Collectable Ledger.

37. Water Supply.—This account is charged with all expense, both labor and supplies for the operation of the water supply plant. This account receives credit for water furnished the various plants.

38. Smithing.—This account is charged with labor and supplies and receives credit for labor performed.

39. Saw Mill.—This account is charged with all labor and supplies to operate and maintain the mill and plant, it receives credit for all lumber, etc., used on a basis of cost per 1000 ft.

40. Depreciation of Animals.—The original cost of all mules and horses is written off in monthly installments, based on the average life of an animal in mine work. This depreciation charge is made to the Hauling account and credited to this account.

41. Profit and Loss.—Into this account are closed the operating and income accounts of the company.

COAL EXPENSE SUB-ACCOUNTS—AUXILIARY RECORDS

1. Expense of Mining.—This account comprises all expense of mining, loading, tramming, tools, etc., and is sub-divided as follows:

A. Hand Mining	J. Powder Man
B. Contract Mining Machine	K. Check Man
C. Day Work Mining Machine	L. Wire Man
D. Drilling, Shooting and Loading	M. Shot Inspectors
E. Loading company Coal	N. Wood Pulp
F. Power house, proportion	O. Earth Tamping
G. Ladders and Tool Boxes	P. Tamping and Powder Boxes
H. Running Man trip	Q. Interpreter.
I. Sharpening Tools	

2. Hauling.—This account is made up of the following sub-divisions:

A. Power house, proportion	J. Harness Repairs and Shoeing
B. Drivers	K. Cleaning up Wrecks
C. Outside Hoistmen	L. Repairs to Haulage Signals
D. Underground Hoistmen	M. Clearing Haulage Tracks
E. Locomotive Men	N. Oil and Waste
F. Rope Runners	O. Roller Repairs and Renewals
G. Couplers and Spraggers	P. Repairing Haulage Entries
H. Roller Men—Greasers	Q. Loss of Animals
I. Stable Expense, proportion	R. Depreciation of Animals.

3. Loading.—This account comprises the following sub-divisions:

- | | |
|-----------------------------|-----------------------------------------|
| A. Outside Foreman's salary | I. Running and Repairing Box-car loader |
| B. Weighmen and Topmen | J. Car handlers |
| C. Pushers and Dumpers | K. Attendance Elevator Screens, etc. |
| D. Couplers and Spraggers | L. Cost of Dummy Doors |
| E. Power House, proportion | M. Unloading Dust and Yard Waste |
| F. Running Chute engine | N. Clearing Yard Tracks |
| G. Loading by day labor | O. Damage to R. R. Cars and Tracks. |
| H. Loading by contract | |

4. Repairs to Cars.—This account comprises the following sub-divisions:

- | | |
|----------------------------|--------------------------------|
| A. Repairing Wrecked cars | C. Replacing lost cars |
| B. Repairing Worn-out cars | D. Replacing wheels and Axles. |

5. Repairs to Track.—This account comprises the following sub-divisions:

- | | |
|---------------------------------|-------------------------------|
| A. Hoist and Locomotive tracks | E. New rails |
| B. Entry and Room Tracks | F. Rail fastenings and Spikes |
| C. Taking up old rails and ties | G. Old rails used. |
| D. New ties used | |

6. Electric Light.—This account comprises the following sub-divisions:

- | | |
|-------------------------------|---------------------------------|
| A. Power house, proportion | C. Replacing Lamps outside |
| B. Repairs to Interior Wiring | D. Replacing lamps in the mine. |

7. Entry Driving.—This account comprises the following sub-divisions:

- | | |
|-----------------------------|-------------------------------------|
| A. Yardage in straight Coal | D. Allowance for boney Coal or rock |
| B. Yardage in Coal and Rock | E. Allowance for rolls |
| C. Yardage in straight Rock | F. Allowance for water. |

8. Rooms and Rolls.—This account comprises the following sub-divisions:

- | | |
|---------------------------------|-------------------------------------|
| A. Rooms turned | D. Allowance for boney Coal or Rock |
| B. Allowance for Rolls in rooms | E. Allowance for water. |
| C. Allowance for Brushing Roof | |

9. Ventilation.—This account comprises the following subdivisions:

- | | |
|-------------------------------------|--------------------------------------|
| A. Power house, proportion | F. Building and Repairing Mine doors |
| B. Gas and Air Inspectors | G. Trappers |
| C. Fan expense and Engineers | H. Cleaning Air Ways |
| D. Building and Repairing Stoppings | I. Repairing Air Ways. |
| E. Brattice Cloth and Bratticing | |

10. Drainage and Watering Mine.—This account comprises the following sub-divisions:

- | | |
|------------------------------|--------------------------|
| A. Power house, proportion | D. Watermen and Supplies |
| B. Outside pumpmen and pumps | E. Ditches and Sumps. |
| C. Inside pumpmen and pumps | |

§ **11. Timber and Props.**—This account comprises the following sub-divisions:

- | | |
|-------------------------------------|---------------------------|
| A. Driving Entries and Rooms | E. Unloading and Piling |
| B. Retimbering and Robbing Rooms | F. Hauling and Sowing |
| C. Repairing Haulage entries | G. Loading and delivering |
| D. Repairing Air and Traveling Ways | H. Drawing Props. |

§ **12. Dead Work.**—This account comprises the following sub-divisions:

- | | |
|-----------------------------------|----------------------------------|
| A. Retimbering Rooms | E. Dumping and stowing rock |
| B. Regrading and Brushing entries | F. Underground Inspection |
| C. Prospecting Faults | G. Replacing Tools and Repairing |
| D. Loading and Hauling Rock | H. Cleaning Camp. |

§ **13. Repairs to Buildings and Chutes.**—This account comprises the following sub-divisions:

- | | |
|-----------------------------------------|----------------------------------|
| A. Main Chute and Trestle | E. Barn and Corral buildings |
| B. Crusher Elevator and Screen building | F. Boarding House |
| C. Power and Boiler House | G. Blacksmith and Machine shops |
| D. Engine House | H. Other mine buildings |
| | I. R. R. Tracks and Mine scales. |

§ **14. Repairs to Machinery.**—This account comprises the following sub-divisions:

- | | |
|--------------------------------|------------------------------------------------|
| A. Boilers and Connections | O. U. G. Air lines |
| B. Steam Lines | P. Outside Electric Power lines |
| C. Stationary steam engines | Q. U. G. Electric Power lines |
| D. Steam hoisting engines | R. Fans and Fan engines |
| E. Electrical hoisting engines | S. Crushers, Elevators, etc. |
| F. Air compressors | T. Tipples and Screens |
| G. Electric Generators | U. Renewal of Wire rope |
| H. Electric Locomotives | V. Mining Machines |
| I. Electric Motors | W. Machinery inspection |
| J. Outside pumps | X. Telephone lines |
| K. U. G. Pumps | Y. Wagons |
| L. Outside Water lines | Z. General Master Mechanic, proportion salary. |
| M. U. G. water lines | |
| N. Outside Air lines | |

15. Superintendence and Clerks.—This account comprises the following sub-divisions:

- | | |
|---------------------------------------------------------|--------------------------|
| A. General and Mine Superintendent's salary, proportion | B. Mine foreman's salary |
| | C. Mine Clerk's salary. |

16. Engineering.—This account comprises the following sub-divisions:

- | | |
|----------------------------------|---------------------|
| A. Mine surveyors and assistants | C. Outside expense. |
| B. Office supplies | |

17. General Expense.—This account comprises the following sub-divisions:

- | | |
|----------------------------------------|--------------------------|
| A. Stationery and Printing, proportion | C. Sundry supplies |
| B. Janitor service | D. Office fixtures |
| | E. Firing office heater. |

18. Incidentals.—This account comprises the following sub-divisions:

- | | |
|---------------------|------------------------------|
| A. Misc. Teaming | E. Watchman |
| B. Pay Day expenses | F. Guard and Special service |
| C. Expense on money | G. Rescue apparatus. |
| D. Free Coal | |

COKE EXPENSE SUB-ACCOUNTS—AUXILIARY RECORDS

40. Coal Used.—To cover the cost of Coal used in making coke.

41. Superintendence and Clerks.—This account comprises the following sub-divisions:

- | | |
|-----------------------------------------------|--------------------------------------|
| A. General and Mine Supt., salary, proportion | C. Office Clerk's salary, proportion |
| B. Coke Oven Foreman's salary | D. Office supplies, proportion |
| | E. Timekeeper. |

42. Engineering.—This account comprises the following sub-divisions:

- | | |
|----------------------------------------------|---------------------------------|
| A. Mine surveyors and assistants, proportion | B. Office supplies, proportion |
| | C. Outside expense, proportion. |

43. Charging Ovens.—This account comprises the following sub-divisions:

- | | |
|--------------------------------|------------------------------------|
| A. Power house, proportion | E. Running Larry cars |
| B. Handling coal at Bins | F. Repairing Larry Cars and Tracks |
| C. Clearing at Bins and Scales | G. Repairing Power and Motor lines |
| D. Weighing charges | H. Repairing Scales. |

44. Burning and Drawing.—This account comprises the following sub-divisions:

- | | |
|--------------------------------|-------------------------------------|
| A. Coke pullers | E. Repairs to Coke oven water lines |
| B. Plastering Oven Doors | F. Repairing Tools |
| C. Power house, proportion | G. Charging Hole Covers. |
| D. Pumping Expense, proportion | |

45. Loading Coke.—This account comprises the following sub-divisions:

- | | |
|------------------------------------|-----------------------------------|
| A. Loading R. R. Cars contract | F. Tool expense and repairs |
| B. Loading R. R. Cars, day labor | G. R. R. Weighman |
| C. Car handlers | H. Cost of Dummy doors |
| D. Clearing R. R. tracks | I. Repairs to R. R. Track scales. |
| E. Damage to R. R. Cars and Tracks | |

46. Loading Cinders.—This account comprises the following sub-divisions:

- | | |
|-------------------------------------|--------------------------------|
| A. Loading and Unloading R. R. Cars | C. Clearing docks |
| B. Hauling in wagons | D. Tool expense and repairs |
| | E. Stable expense, proportion. |

47. Firing Cold Ovens.—This account comprises the following sub-divisions:

- | | |
|--------------|----------------------------------|
| A. Wood used | C. Charging, Burning and Drawing |
| B. Coal used | D. Disposing of cinders. |

48. Repairs to Coke Ovens.—This account comprises the following sub-divisions:

- | | |
|------------------------|---------------------------|
| A. Brick and fire clay | D. Replacing ovens |
| B. Stone Lime, etc. | E. Repairs to dock walls. |
| C. Iron door frames | |

49. Repairs to Buildings.—This account comprises the following sub-divisions:

- | | |
|-------------------------|-------------------------|
| A. Slack bins | D. Trestles and Bridges |
| B. Store and tool house | E. Supt. Office. |
| C. Scale house | |

50. Coke Experiments.—This account comprises the following sub-divisions:

- | | |
|------------------------------|-------------------------------------|
| A. Preparing and Coking coal | C. Cost of Analysis |
| B. Transportation on samples | D. Repairs to laboratory equipment. |

51. Incidentals.—This account comprises the following sub-divisions:

- | | |
|--------------------|-----------------------------------|
| A. Pay day expense | D. Free coal |
| B. Watchman | E. Telephone service and repairs. |
| C. Janitor service | |

CLOSED ACCOUNT

Power House.—This account so-called comprises all the expenses to operate the power plants, both steam generators and steam driven engines, delivering power to the mine plant or workings as Air, Steam or Electricity.

While called an account it does not appear so on the books but is handled in this manner, all labor is charged to the account in the distribution of labor, and is distributed to the various accounts benefited by the steam plant on a basis of power used. This same idea is used in distributing supplies charged to the power house. Power house is merely a charging head under which the different items are gathered, the sum of the labor being further distributed on the same report, and the supplies further distributed on the supply report.

GENERAL OFFICE ACCOUNTING

Books. —Cash Book	Bills Collectable Ledger
Journal	Abstract of Bills Collectable
General Ledger	Abstract of Vouchers.
Coal Sales Ledger	

The above are the most important books although there are detailed records covering all expenses kept in auxiliary records.

Cash Book.—The Cash Book is kept by the Treasurer of the company, who pays all bills and handles all finances. All vouchers approved and passed through the company books are transmitted to the Treasurer for payment, by the Auditor. At the end of each month the Treasurer furnishes the Auditor with a detailed statement of all cash receipts and disbursements. This statement is journalized debiting and crediting the proper accounts.

Journal.—All journal entries must be signed by the Chief Clerk as correct and approved by the Auditor, before entered on the books.

Ledger.—The general ledger is kept in the usual way carrying the accounts as outlined in the forepart of this article.

Ledger Coal Sales.—This ledger is subsidiary to the General Ledger, account of Individuals and Companies Coal Sales, carrying the detailed accounts whereas the general ledger account carries the aggregate amount, or controlling account.

Ledger Bills Collectable.—This ledger is subsidiary to the General Ledger, account of Individuals and Companies, Bills Collectable, carrying the detailed accounts, whereas in the General Ledger the account is shown as a whole.

Abstract Bills Collectable.—This book is a journal in which are entered all Bills Collectable, debiting and crediting the proper accounts. These entries are posted in detail to the Bills Collectable ledger and in the aggregate to the general ledger, Individuals and Companies Bills Collectable account.

Abstract of Vouchers.—This book which is very large has various columns that are headed as follows in the rotation given:

Voucher Number	Personal Injury Fund
Favor of	Individuals and Companies
Amount	Medical Dept.
Date transmitted to Treasurer	Boarding house Expenditures
Date paid	Boarding house Receipts
Material and Supplies	Saw Mill
Mine Expenses	Water Supply
General Expenses	Pay-roll Deficiency
Coke Expenses	Smithing Account
Earnings	Unadjusted Legal Expense
Rents	Unclaimed Wages
Depreciation of Animals	Profit and Loss.

[illegible]

FIG. 148.—FORM 2.

Digitized by Google

Extraordinary Expenses.—All Extraordinary Expenses which are estimated to cost \$100.00 or more, require the approval of the General Manager and General Superintendent. The method of handling these items is to make out at the mine an estimate of the required work on form 2 (Fig. 148) in quadruplicate, giving the details regarding the location and necessity of the work, also detailed estimates. These estimates pass through the General Superintendent to the General Manager for approval; after being approved the work may be started. The disposition of these forms is printed at the bottom of the form.

Utah Fuel Company Pleasant Valley Coal Company		Form 243	Appropriation No.
ESTIMATE OF IMPROVEMENTS, ETC.			
ALL NEW WORK OR BETTERMENTS TO BE AUTHORIZED ON THIS BLANK BEFORE WORK IS COMMENCED. TO BE MADE IN DUPLICATE.			
Gen'l Mgr. Dep't. No.		Utah, 190	
Gen'l Sup't " "			
Land " "			
1. Location			
2. Title			
3. General description			
4. New work or betterments			
5. Necessity for same			
6. Estimate of Cost: Labor, \$ Material, \$ Total, \$			
7. Work should be commenced			
8. Length of time required to complete work			
9. To be charged to			
		Approved	
		Gen'l Superintendent.	Gen'l Manager.
Date Commenced 190		Date Completed 190	
ESTIMATED COST { Labor, \$ Material, \$ Total, \$		ACTUAL COST { Labor, \$ Material, \$ Total, \$	
Increase, \$ Per Cent		Decrease, \$ Per Cent	
APPLICATIONS TO BE TRANSMITTED AS FOLLOWS:			
1st—Original and Duplicate to General Manager for approval.			
2d—Original to General Superintendent and Duplicate to Auditor.			
3d—Original to Auditor when work is completed to be checked and returned to General Superintendent through General Manager.			

FIG. 149.—FORM 3.

Improvements.—All expenditures for Additions to Plant and Improvements require a special appropriation if the amount involved exceeds \$100.00. An estimate of the work contemplated is made out on form 3 (Fig. 149), in duplicate by the mine Supt., and forwarded to the General Manager, through the General Supt. for approval.

The General Manager makes out an "Appropriation for Improvements," form 4 (Fig. 150), in triplicate and forwards it to the Vice President for approval; after being approved the work may be started. The disposition of the form is explained on the form itself. Copies of all

DUPLICATE		Appropriation No.
APPROPRIATION FOR IMPROVEMENTS		
ALL NEW WORK OR BETTERMENTS TO BE AUTHORIZED ON THIS BLANK BEFORE WORK IS COMMENCED. TO BE MADE IN TRIPPLICATE		
To the Second Vice President,		Utah, 190
Denver, Colorado.		
I would respectfully recommend an appropriation for improvements described below, with details attached, and request your approval of the same:		
Gen'l Supt's Dep't No.		
Land		
1. Location		
2. Title		
3. General description		
4. New work or betterments		
5. Necessity for same		
6. Estimate of Cost: Labor, \$ Material, \$ Total, \$		
7. Work should be commenced		
8. Length of time required to complete work		
9. To be charged to		
Approved:		
Second Vice President		General Manager
Date Commenced 190		Date Completed 190
ESTIMATED COST	Labor, \$ Material, \$ Total, \$	ACTUAL COST { Labor, \$ Material, \$ Total, \$
Increase, \$ Per Cent Decrease, \$ Per Cent		
APPLICATIONS TO BE TRANSMITTED AS FOLLOWS:		
1st—Original, Duplicate and Triplicate to Second Vice President for approval.		
2d—Original and Duplicate to General Manager when approved.		
3d—Original to Auditor to be checked and returned to General Manager when work is completed.		

FIG. 150.—FORM 4.

"Appropriations" go to the Auditor, who opens separate accounts with each one in the auxiliary records.

At the end of each month a statement form 5 (Fig. 151), is made up for each mine, listing the various appropriations for Improvements, Additions to Plant, etc., and showing against each one the expenditures for the month. These expenditures are sub-divided as follows: Vouchers, Pay-rolls, Material and Total.

Another statement is made up each month for each mine, listing each appropriation made during the fiscal year, the nature of the work authorized, the estimated cost, amount expended to date, and the balance of the appropriation available to complete the work. See form 6 (Fig. 152).

Transfer of Equipment, Supplies, Etc.—As it frequently happens that it is advisable to transfer material from one mine to another, a proper record of the transfer is necessary, and to facilitate matters a "Transfer Letter" (form 7, Fig. 153) is made out in triplicate by the mine supt. shipping the material in question, giving the details of the material transferred. The original copy is forwarded to the Auditor, and the duplicate and triplicate to the consignee. Upon receipt of

Form 506-11-1-10-1m-R. P.	
TRANSFER LETTER	
Mr.	191.....
..... Mine Superintendent	
Dear Sir:	
The following items have been reported to Auditor, as a charge to your mine, month of .....191.....	
Charge M. & S. Acct. \$ Credit M. & S. Acct. \$	Total . . . \$
I have also charged your mine direct from our pay-rolls, as follows:	
Checked and Accepted Mine Superintendent	Yours truly, Mine Superintendent
NOTE: Instructions from Auditor. Charges to your various M. & S. Acct's should be charged out on your monthly M. & S. Report just as soon as material is used, giving reference to source of charge. Direct charges from other mine pay-rolls to your M. & S. Acct. you will take up and charge out as used, but charges to Underground Inspection, B. & B. H. Expenses, or any other account but M. & S. Acct., is taken up by the Auditor and charged to the proper account.	

FIG. 153.—FORM 7.

material the receiving Supt. will O. K. the duplicate copy and forward to the Auditor.

Depreciation.—The Coal Lands of the company are depreciated or written off on a basis of acreage worked out each year. That is to say that the total cost of the coal lands of each mine represents an average value per acre, and as the depreciation is not considered until the mine is on a permanent producing basis, it is only necessary to estimate the number of acres that will be exhausted at the end of the year to arrive at the proper amount to write off during the year. This amount is pro-rated one-twelfth each month to Depreciation of General Plant A/c. Any inaccuracies that may be made in estimating the amount that is written off during the year is adjusted during the following year.

Depreciation of Plant Buildings, etc., is charged and credited as above, in addition to charge for acreage worked out.

Depreciation of Plant Account is estimated on a basis of the life of the mine and is dependable on the production. At the time the mine is placed on a permanent producing basis the plant account will represent an average amount per acre, as depreciation is figured from the estimated acreage to be worked out during the year, the amount to be written off during the year is arrived at by multiplying the average plant expenditures per acre by the estimated acreage to be exhausted during the year. This amount is pro-rated one-twelfth each month to Sinking Fund Installment and credited to Depreciation Account. As the Plant Account varies from year to year, by the expenditure of additional capital for additions, improvements, etc., it is necessary to adjust this account each year.

Details of General Expenses.—In order that an accurate detailed record may be kept of all expenditures and segregated so as to show each account, sub-account also each appropriation, this detail of General Expenses is kept. The expenditures are posted each month to these accounts from the Pay-rolls, Vouchers, Report of Material and Supplies.

REPORTS, ETC., RECEIVED FROM THE MINES

- Pay-rolls
- Pay-roll Deductions
- Pay-roll Distribution
- Boarding House Report
- Rent Statement
- Animals Killed and Sold
- Pay-roll Deficiency List
- Unclaimed Wages List
- Supplies Used Report
- Daily Report Mine Operations
- Daily Report Coke Oven Operations
- Average Report of Operations

Weighmaster's Report
Daily Shipping Report
Report of Coal Mined—Distribution
Report of Hay and Grain
Nationalty Report
Statement of Local Coal sales.

Pay-rolls.—All Pay-rolls are received from the mines as soon after the end of the month as they are completed. These Pay-rolls are entered in the Abstract of Vouchers and charged to accounts receiving benefit as shown by Distribution of Pay-rolls, and credited to Pay-rolls. When paid the amount is credited to the Treasurer and charged to Pay-roll account.

Pay-roll Deductions.—These reports are entered in the Abstract of Vouchers the total amount of deductions that go as credit to company ledger accounts are charged to Pay-roll account and the other deductions are charged to their proper accounts.

Boarding-house Reports.—These reports are checked up with the debit and credit charges on the books and the free board furnished is charged to mine expense account and credited to Boarding-house Receipts.

Animals Killed and Sold.—The debits and credits as shown by these reports are journalized, the value of Animals killed or sold being credited to the Animals Killed and Sold account and charged to Hauling. The cost of Animals purchased would be charged to that account thus making the same entries as appear on the mine books.

Unclaimed Wages.—These reports list the individuals and amount due them in wages that remain unclaimed on pay day and are returned to the General Office with the amount in cash. These wages are placed to the credit of the Unclaimed Wages account by journal entry and charged to the Treasurer.

Supplies Used Report.—These reports are passed through the abstract of Vouchers and charged to the various mine accounts, the total being credited to Material and Supply account.

Daily Shipping Report.—These reports cover the shipment of all Coal and Coke and are received daily. They are recapitulated, showing the tonnage of Coal and Coke, also the accrued earnings for the same. Journal entries are made from these reports charging consignees and crediting earnings with the amounts shown.

REPORTS MADE AT THE GENERAL OFFICE

Supplies.—A statement of the Material and Supply account is made up each month (form 8, Fig. 154) by the Auditor. This statement shows the balance of the account at the first of the month and all debits to the account. The credits are itemized showing the totals as charged to the

different accounts. All journal entries effecting the Material and Supply account are also shown.

Recapitulation of Shipments.—This record is made up on form 9 (Fig. 155) from the Daily Reports of Shipments received from each mine each day. The shipments are shown according to grade, the weight and estimated earnings being also shown.

UTAH FUEL COMPANY																						
Statement of Material and Supplies Account										Mine No. _____ for Month of _____ 191__												
Balance from Last Month										MINE EXPENSES						Rents						
Total Charges from Vouchers											Mining						Coal Sales at Mine					
Labor from Pay Rolls											Hauling						B. & B. H. Expenses					
Coal to Boilers, Etc.											Loading						B. & B. H. Fixtures					
Transferred from											Repairs to Cars						Ind'l's and Co.'s					
											Repairs to Tracks						Bills Collectible					
											Electric Light						Medical Dep't.					
											Entries											
											Rooms											
											Ventilation											
											Watering											
											Timber and Props						CAPITAL CHARGES					
											Dead Work						T.C. and Trusties					
											Rep. Bldgs. and Chutes						Cars and Tracks					
											Repairs Machinery						Power and Machinery					
											Supt. and Clerks						Buildings					
											Engineering						Mine Development					
											General Expenses											
											Incidentals											
											Total Mine Expenses											
											COKE EXPENSES						CHARGES TO OTHER MINES					
											Coal Used						Winter Quarters M. & B.					
											Supt. and Clerks						Castle Gate M. & B.					
											Engineering						Clear Creek M. & B.					
											Charging Ovens						Sunnyside M. & B.					
											Burning and Drawing						Somerset M. & B.					
											Loading Coke											
											Loading Cinders											
											Firing Cold Ovens											
											Repa. Coke Ovens											
											Repa. to Buildings						Total Miscellaneous					
											Coke Experiments						No. Mine Coal Exp.					
											Incidentals						No. Mine Coal Exp.					
																	Total Coke Expenses					
											Total Coke Expenses						Balance on Hand					
TOTAL																	TOTAL					

FIG. 154.—FORM 8.

Tonnage and Earnings.—A weekly statement is made out by the Auditor showing the estimated tonnage and earnings, this year, last year and the increase or decrease. (Form 10, Fig. 156.)

Cost Sheet Coke Ovens.—A detailed report of operations at the Coke Ovens is made up each month, showing the expenditures against each account and sub-account. These charges are divided, showing labor and material separate. The information for this Cost Sheet is taken from the Pay-roll distribution, Report of Material and Supplies Used and the Production record. (See form 118, Fig. 157.)

RECAPITULATION															
Of Daily Report of Shipments from _____ Mine, Month of _____ 19____															
LUMP		ENGINE		NUT		BUS OF MINE		SLACK		TOTAL COAL		COKE		TOTAL COKE	
Pounds	Earnings	Pounds	Earnings	Pounds	Earnings	Pounds	Earnings	Pounds	Earnings	Pounds	Earnings	Pounds	Earnings	Pounds	Earnings
1															
2															
3															
4															
5															
30															
31															
Grand Total															
Per year to date															

Fig. 155.—Form 9.

DETAILED REPORT OF OPERATING EXPENSES AT

COAL EXPENSES	LABOR	MATERIAL	COAL EXPENSES	LABOR	MATERIAL
1 EXPENSE OF MINING			2 VENTILATION		
Head Miner			Proportion Power House Expense		
Contract Machine Mining			Gas and Air Inspectors		
Day Work Machine Mining			Fan Expenses and Engineer		
Drilling, Shooting and Loading			Building and Repairing Stoppings		
Loading Company Coal			Brattice Cloth and Bratticing		
Proportion Power House Expense			Building and Repairing Mine Doors		
Ladders and Tool Boxes			Trappers		
Running Man Trip			Cleaning Air Ways		
Sharpening Tools			Repairing Air Ways		
Powder Man					
Check Man					
Wire Man					
Shot Inspectors					
Wood Pulp					
Earth Tamping					
Tamping and Powder Boxes			10 DRAINAGE AND WATERING MINE		
Interpreter			Proportion Power House Expense		
			Outside Pumps and Pumps		
			Inside Pumps and Pumps		
			Water Men and Supplies		
3 HAULING					
Proportion Power House Expense					
Drivers					
Outside Haulman					
Underground Haulman					
Locomotive Men			11 TIMBER AND PROPS		
Rope Runners			Driving Entries and Rooms		
Couplers and Spraggers			Retimbering and Robbing Rooms		
Roller Men and Greasers			Repairing Haulage Entries		
Proportion Stable Expense			Repairing Air and Traveling Ways		
Harness Repairs and Shoeing			Unloading and Piling		
Cleaning up Wrecks			Hauling and Sawing		
Repairs Haulage Signals			Loading and Delivering		
Cleaning Haulage Tracks			Drawing Props		
Roller Repairs and Renewals					
Repairing Haulage Entries					
Depreciation of Animals					
			12 DEAD WORK		
			Retimbering Rooms		
			Regrading and Brushing Entries		
			Prospecting Faults		
4 LOADING			Loading and Hauling Rock		
Outside Foreman's Salary			Dumping and Stowing Rock		
Weightmen and Topmen			Underground Inspection		
Fashers and Dumpers			Repairing and Replacing Co. Tools		
Couplers and Spraggers					
Proportion Power House Expense					
Running Chute Engine					
Loading by Day Labor					
Loading by Contract					
Runny & Rep'g Box Car Loader					
Car Handlers					
Attendance Elevators, Screens, etc.			13 REPAIRS TO BLDGS. & CHUTES		
Cost Dummy Doors			Main Chute and Trestle		
Unloading Dust and Yard Waste			Crusher, Elevator & Screen Bldg's		
Cleaning Yard Tracks			Power and Boiler Houses		
Damage to R. R. Cars and Tracks			Engine House		
			Barn and Corral Buildings		
			Dwelling Houses		
4 REPAIRS TO CARS			Blacksmith and Machine Shops		
Repairing Wrecked Cars			Other Mine Buildings		
Repairing Worn Out Cars			R. R. Track and Mine Scales		
Replacing Lost Cars					
Replacing Wheels and Axles					
			14 REPAIRS MACHINERY		

FIG. 158.—FORM 110.

.....MINE. MONTH OF.....

FIG. 158.—Continued.

[illegible]

Exhibit.....19....

For month of.....

Digitized by Google

FUEL COMPANY																		
DETAIL OF OPERATING EXPENSES FOR MONTH OF _____																		
ACCOUNTS	WINTER QUARTERS MINE			CASTLE GATE MINE			CLEAR CREEK MINE			UTAH MINE			BUNKYBIDE MINE			BOMERNEY MINE		
	TOTAL EXPENSES	COST PER TON This Year	Per Ton	TOTAL EXPENSES	COST PER TON This Year	Per Ton	TOTAL EXPENSES	COST PER TON This Year	Per Ton	TOTAL EXPENSES	COST PER TON This Year	Per Ton	TOTAL EXPENSES	COST PER TON This Year	Per Ton	TOTAL EXPENSES	COST PER TON This Year	Per Ton
COAL (all grades)																		
Expenses of Mining																		
Blasting																		
Locating																		
Repairs to Cars																		
Repairs to Trucks																		
Electric Light																		
Entry Drilling																		
Rooms and Rolls																		
Ventilation																		
Drainage and Winding Mine																		
Expenses to Open																		
Dark Work																		
Repairing Bridge and Chutes																		
Repairing Machinery																		
Superintendents and Clerks																		
Engineering																		
General Expenses																		
Salaries																		
Total Expenses at Mine																		
Salaries Gen'l Officers and Clerks																		
Expenses and Supplies																		
Law																		
Rents																		
Stationery and Printing																		
Other Expenses																		
Total General Expenses																		
Total Coal Expenses																		
COKE (all grades)																		
Coal Used																		
Superintendents and Clerks																		
Engineering																		
Charging Orans																		
Blasting and Drilling																		
Locating Coke																		
Loading Chutes																		
Firing Cold Orans																		
Repairs to Coal Orans																		
Repairs to Buildings																		
Cable Expenses																		
Expenses																		
Total Coal Expenses																		
Total Coal Mined																		
Days Mine Worked																		
Average Mined Per Day																		
Average No. Miners Working																		
Average Tons per Man Daily																		
Total Coal Made																		
Total Coal Used																		
Percentage of Coke to Coal																		
No. Orans Driven																		

Self Lake City, Utah, Correct. Auditor.

Fig. 159.—Form 13.

GENERAL PROFIT AND LOSS ACCOUNT

By income as above	.....
To	.....	.....
Balance	.....	.....
Balance to credit of Profit and Loss account	.....	.....
month of.....		

INCOME ACCOUNT

Fiscal year to date		
From June 1.....to.....		
Gross Earnings from sale of Coal and Coke	.....
Operating Expenses	.....
Total net earnings from mines	.....
Add receipts from miners houses	.....
Interest Discount and Exchange	.....
Total Income	.....
Deduct fixed charges		
Taxes Nevada	.....
Insurance	.....
Personal Injury Claims	.....
Coal Prospecting	.....
Depreciation of General Plant account	.....
NET INCOME	.....

GENERAL PROFIT AND LOSS ACCOUNT

Balance to credit of Profit and Loss account	.....
.....30.....	.....	.....
Income as above.....months	.....
Balance	.....
Balance at the credit of Profit and Loss account	.....
.....

BALANCE SHEET

Current Assets.		
Material and Supplies	.....
Engineering Property	.....
Cash in Treasury	.....
Due from Indvs. and Comps. Coal sales	.....
Due from Indvs. and Comps. Bills Collectible	.....
Bills Receivable	.....
Fire Insurance (not charged out)	.....
Pay-roll overdrafts	.....
Current Liabilities.		
Vouchers	.....
Pay-rolls	.....
Unclaimed Wages	.....
.....R. R. Co., for freight	.....
on.....tons Coal	.....
Taxes Nevada payable	.....

General Accounts.

Cost of Property	.....
Additional Expenditures	.....
Lands, Swan Creek	.....
Machinery for General Prospecting	.....
Saloon buildings	.....
Boarding house fixtures	.....
Less Depreciation	.....
Capital Stock	.....

Deferred Accounts,

Personal Injury Fund	.....
Animals Killed and Sold	.....
Special Renewal Fund	.....
Profit and Loss	.....
	\$..... \$.....

DETAILS OF ADDITIONAL EXPENDITURES

.....19....to.....19....

Accounts,

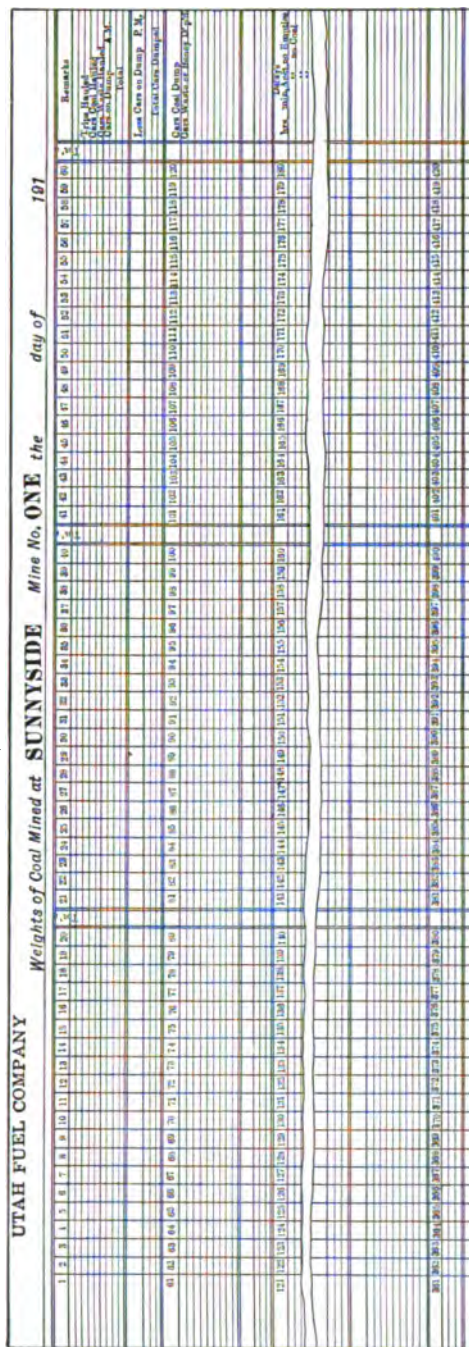
Lands	.....
Tramways Chutes and Trestles	.....
Cars and Tracks	.....
Power and Machinery	.....
Buildings	.....
Mine Developments	.....

MINE OFFICE ACCOUNTING

Timekeeping.—Both outside and inside foremen are supplied with pocket Time Books (form 15, Fig. 161). These books are designed for one month's use, each employee being assigned a page each month

.....191.....		
DATE		OCCUPATION
1		
2		
3		
4		
5		
.....		
27		
28		
29		
30		
31		

Fig. 161.—FORM 15.



Time Book (form 15, Fig. 161). It will be noted that the Time Book is designed specially with this feature in mind, a division of each man's labor being shown for each day. This Distribution of Labor, of course, is made out according to the schedule of accounts and sub-divisions thereof called for by the mine books. This distribution as furnished by the foremen is a plain statement as to what the men are doing and a division

[illegible]

FIG. 166.—FORM 20.

of their time in accordance therewith. When this distribution is reported to the Mine Clerk for entry in the Office Time Book, he will also show in connection with the information furnished by the foremen, the account or sub-division chargeable, and rate of pay therefore. At the end of the month the time and earnings are extended in the Office Time Book for each job. This Office Time Book furnishes not only a record of the time but also a distribution of labor for each employee.

Pay-roll.—The Pay-roll, form 2 (Fig. 167), is made up from the Time Book and the Record of Coal Mined book. Employees names are entered

UTAH FUEL COMPANY										PAY ROLL										MINE, FOR MONTH OF _____										Pay Roll No. _____									
I acknowledge to have received from the UTAH FUEL COMPANY, the amount opposite my name in the following list, being 1/10 of all demands for work done at _____										MINE, during regular and irregular hours to amount of _____										Pay Roll No. _____																			
NAME	CITY	HOW EMPLOYED	LARGE FUEL OIL USED			TOTAL CREDIT			DEDUCTIONS			TOTAL DEBIT			U. F. Co. Deductible	U. F. Co. Balance Due	DATE PAID	No. Check	No. 1																				
			Days	Rate	Amount	Days	Rate	Amount	Days	Rate	Amount	Days	Rate	Amount																									
1																																							
2																																							
3																																							
4																																							
24	Steady Individuals & Co's																																						
25	Utah Fuel Co. Individuals																																						
26	Utah Fuel Co. Company																																						
27	Utah Fuel Co. Department																																						
TOTALS																																							

I certify that the above men have been diligently employed during the time specified, and that the compensation, mine and mine supply, is correct.

Correct, _____ Mine Supl.

Approved, _____ Gen'l. Manager

Approved, _____ Auditor

Approved, _____ Vice President

FIG. 167.—FORM 2.

in numerical order according to their check numbers. After earnings have been posted to the Pay-roll, all Time Certificates issued in settlement during the month will be checked and posted in.

Deductions are posted as follows:

- Medical Dept.
- Smithing from Material and Supplies Used Report
- Material from Material and Supplies Used Report
- Fuel from Material and Supplies Used Report
- Rents from Rental Records
- Board from Boarding-house report
- Coupons from Coupon Book
- Pay-roll Deficiency from previous month's roll
- Coupon deficiency from previous month's roll.

A deficiency occurs by employees overdrawing their accounts, and may come about in two ways. As an example, say an employee has earned \$60.00 and after all deductions have been made, except for say material account, he would have a credit of say \$5.00; now if the charge against him for material is \$7.00 the rule is to make this deduction, but by doing so the account will be overdrawn, in this instance \$2.00. This constitutes a Pay-roll deficiency, which will be collected the following month.

By following this rule all charges against employees are collected and the proper accounts receive credit the same month that the charge is made. The other example is when the coupon account is overdrawn, and in a case of this kind it is handled in the same way as the previous case except that it is shown as a coupon overdraft.

An itemized list of the Pay-roll deficiency is made out with an explanation of each case and forwarded to the Auditor with the Pay-roll.

Pay-rolls are made out in duplicate, a copy being forwarded to the Auditor. The Pay-roll is certified to by the mine Supt., before being forwarded to the Auditor and before being paid must be approved by the General Supt., General Manager, Auditor and Vice President.

After the Pay-roll is complete and a copy forwarded to the Auditor, statements (Fig. 168, form 22, dockets), are made out for each employee. These statements are distributed to the men as soon after the first of the month as possible.

On pay day these dockets must be presented to the Paymaster properly signed, for which they will receive their pay in cash.

If the total amount of the Pay-roll is not paid out on pay day by the Paymaster, the balance is returned to the General Office and placed to the credit of "Unclaimed Wages." Employees calling for their wages after pay day, are paid in cash by the mine Supt., who accepts the statement as a receipt and forwards the same to the General Office as a cash remit-

tance. The Treasurer will make an entry in his books charging "Un-claimed Wages" and crediting Cash with the amount.

Form 438-B 2-15-10 5M		Roll _____	Name _____	Ck _____
NOT TRANSFERABLE				
Sign in Ink PERSONALLY and Present on PAY DAY				
Statement for Month of _____				19__
IN ACCOUNT WITH UTAH FUEL COMPANY AT CASTLE GATE MINES				
Labor _____	Days, @ _____			
" _____	Hours, @ _____			
" _____	Trips, @ _____			
" _____	Ovens, @ _____			
Driving Entry _____	Yards, @ _____			
" " _____	" @ _____			
Turning Rooms _____	@ _____			
_____ Cars _____	Tons, @ _____			
_____ " _____	" @ _____			
TOTAL EARNINGS				
Medical Department _____				
Smithing _____				
Fuel and Material _____				
House and Ground Rent _____				
Board _____				
Insurance _____				
Coupons, Current Month _____				
Coupon Balance last Month _____				
TOTAL EXPENSES				
BALANCE				
Received payment in full of above account				
_____ 19__				
Sign here _____				
Witness _____				

FIG. 168.—FORM 22.

Pay-roll Deductions.—A detailed statement of deductions made on the Pay-roll is made up in duplicate and a copy forwarded to the Auditor with the Pay-roll. This statement form 23 (Fig. 169) shows deductions made, and the deductions set out in detail. On the reverse side of the sheet the deductions are summarized. The statement is journalized, crediting Pay-roll with the gross amount and debiting sundry accounts with the distribution.

[illegible]

FIG. 169.—Form 23.

UTAH FUEL COMPANY

Form 469
2-22-11 500

Distribution of Pay-rolls at _____ Mine No. _____ For Month of _____ 191

COAL EXPENSES	COAL EXPENSES	COAL EXPENSES
1 EXPENSE OF MINING Hand Mining Contract Machine Mining Day Work Machine Mining Drilling, Shooting and Loading Loading Company Coal Ladders and Tool Boxes Running Man Trip Sharpening Tools Powder Man Check Man Wire Man Shot Inspectors Earth Tamping Tamping and Powder Boxes Interpreter	Harness Repairs and Shoeing Clearing up Wrecks Repairs Haulage Signals Cleaning Haulage Tracks Roller Repairs and Renewals Repairing Haulage Entries 3 LOADING Outside Foreman's Salary Weighmen and Topmen Pushers and Dumpers Couplers and Spraggers Proportion Power House Expense Running Chute Engine Loading by Day Labor Loading by Contract Runn'g & Rep'g Box Car Loader Car Handlers Attendance Elevators, Screens, etc. Cost Dummy Doors Unloading Dust and Yard Waste Cleaning Yard Tracks Damage to R. R. Cars and Tracks	4 REPAIRS TO CARS Repairing Wrecked Cars Repairing Worn Out Cars Replacing Lost Cars 5 REPAIRS TO TRACKS Hoist and Locomotive Tracks Ordinary Entry and Room Tracks Taking up Old Rails and Ties 6 ELECTRIC LIGHT Proportion Power House Expense Repairs Interior Wiring 7 ENTRY DRIVING Yardage in Straight Coal Yardage in Coal and Rock Yardage in Straight Rock

Fig. 170.

COAL EXPENSES	COAL EXPENSES	COAL EXPENSES
<p>Allowance for Boney Coal or Rock</p> <p>Allowance for Rolls</p> <p>Allowance for Water</p>	<p>11 TIMBER AND PROPS</p> <p>Driving Entries and Rooms</p> <p>Retimbering and Robbing Rooms</p> <p>Repairing Haulage Entries</p> <p>Repairing Air and Traveling Ways</p> <p>Unloading and Piling</p> <p>Hauling and Sawing</p> <p>Loading and Delivering</p> <p>Drawing Props</p>	<p>14 REPAIRS MACHINERY</p> <p>Boilers and Connections</p> <p>Steam Lines</p> <p>Stationary Steam Engines</p> <p>Steam Hoisting Engines</p> <p>Electric Hoisting Engines</p> <p>Air Compressors</p> <p>Electric Generators</p> <p>Electric Locomotives</p> <p>Miscellaneous Electric Motors</p> <p>Outside Pumps</p> <p>Underground Pumps</p> <p>Outside Water Lines</p> <p>Underground Water Lines</p> <p>Outside Air Lines</p> <p>Underground Air Lines</p> <p>Outside Electric Power Lines</p> <p>Underground Electric Power Lines</p> <p>Fans and Fan Engines</p> <p>Proportion Crushers, Elevators, etc.</p> <p>Tipples and Screens</p> <p>Renewal Wire Ropes</p> <p>Mining Machines</p> <p>Machinery Inspection</p> <p>Telephone Lines</p> <p>Wagons</p> <p>Prop'n Salary Gen'l Master Mech.</p>
<p>8 ROOMS AND ROLLS</p> <p>Rooms Turned</p> <p>Allowance for Rolls in Rooms</p> <p>Allowance for Brushing Roof</p> <p>Allowance for Boney Coal or Rock</p> <p>Allowance for Water</p>	<p>12 DEAD WORK</p> <p>Retimbering Rooms</p> <p>Regrading and Brushing Entries</p> <p>Prospecting Faults</p> <p>Loading and Hauling Rock</p> <p>Dumping and Stowing Rock</p> <p>Underground Inspection</p> <p>Repairing Company Tools</p> <p>Cleaning Camp</p>	<p>15 SUPERINTENDENTS AND CLERKS</p> <p>Prop'n Gen. and Mine Supt's Salaries</p>
<p>9 VENTILATION</p> <p>Proportion Power House Expense</p> <p>Gas and Air Inspectors</p> <p>Fan Expenses and Engineer</p> <p>Building and Repairing Stoppings</p> <p>Brattice Cloth and Bratticing</p> <p>Building and Repairing Mine Doors</p> <p>Trappers</p> <p>Cleaning Air Ways</p> <p>Repairing Air Ways</p>	<p>13 REPAIRS TO BLDGS. AND CHUTES</p> <p>Main Chute and Trestle</p> <p>Crusher, Elevator and Screen Bldg.</p> <p>Power and Boiler Houses</p> <p>Engine House</p> <p>Barn and Corral Buildings</p> <p>Boarding Houses</p> <p>Blacksmith and Machine Shops</p> <p>Other Mine Buildings</p> <p>R. R. Track and Mine Scales</p> <p>Hospital</p>	
<p>10 DRAINAGE AND WATER'G MINE</p> <p>Proportion Power House Expense</p> <p>Outside Pumps and Pumpmen</p> <p>Inside Pumps and Pumpmen</p> <p>Water Men and Supplies</p> <p>Ditches and Sumps</p>		

Fig. 170.—Continued.

COAL EXPENSES	COAL EXPENSES	COAL EXPENSES
Mine Foreman Mine Clerks 16 ENGINEERING Mine Surveyors and Assistants Office Supplies Outside Expenses 17 GENERAL EXPENSES Janitor Service Sundry Supplies Office Fixtures Firing Office Heater 18 INCIDENTALS Miscellaneous Teaming Pay Day Expenses Free Coal Watchman Guard and Special Service Ex. Rescue Apparatus RECAPITULATION Expense of Mining Hauling Loading Repairs to Cars	Repairs to Tracks Electric Light Entry Driving Rooms and Rolls Ventilation Drainage & Watering Mine Timber and Props Dead Work Repairing Bldgs. and Chutes Repairs Machinery Superintendents and Clerks Engineering General Expense Incidentals Total Expenses Mine No. Total Expenses Mine No. Total Coke Expenses Material and Supplies Rents Coal Sales Boarding and B. House Exp. Individuals and Co.'s Saw Mill Account Medical Dept. Water Supply Account Depreciation of Animals	CAPITAL CHARGES Tranways, Chutes & Trestles Cars and Tracks Power and Machinery Buildings Coke Ovens Lands CHARGES TO OTHER MINES Total Amount of Roll Corred:

.....
Mine Superintendent.

Fig. 170.—Continued.

prices and terms. The original and duplicate copies are forwarded to the mine receiving the material in question. The Material Clerk checks against the material received and also the purchasing order and if correct he O. K.'s. Each invoice is then entered in the stock ledger, giving all information called for. The original invoice is then forwarded to the Purchasing Agent, by him turned over to the Auditor for Vouchering, it then goes to the Treasurer for payment.

A record of all orders placed is kept by the Purchasing Agent, showing the Requisition and Order number and date, who ordered from and information regarding the receipt and forwarding of the invoices. See form 31 (Fig. 177).

UTAH FUEL COMPANY										
Record of orders placed for material and invoices received and transmitted for vouchering										
-----mine----- 19-----										
Req.		Order		Ordered from	Material and Supplies	Invoices received and transmitted.				
No.	Date	No.	Date			Recd.	To Mine	From Mine	To Auditor	Invoice.
									Date	Amount

FIG. 177.—FORM 31.

Bills Collectable.—These bills are really accounts receivable of a sundry nature. They are made out to cover rent due from tenants not in the employ of the company, providing it has not been paid in cash when due, also for material, fuel or labor furnished to individuals.

Boarding House—Record of Meals Served.—This record is kept on form 32 (Fig. 178) by the boarding-house manager. All meals furnished whether free, chargeable or cash, are accounted for. The manager fills in the name of each person he boards, his check number, if an employee of the company, and the number of meals served to him each day; the balance of the information called for is filled in by the Mine Clerk.

Board is furnished to employees of the company only on presentation of an order from the mine office properly signed, stating that the bearer, Name, check No. . . is entitled to room and board until further notice; on the issue of the order employee is charged with

board until the order is returned to the office upon his leaving the boarding house, by the employee of the company.

Record of Meals Served at _____									
NAME	Ck. No	No Meals	RATE		Room Rent	Total to Collect	HOW COLLECTED		
			Per Day	Per Month			Pay Roll	Cash	B.C.

FIG. 178.—FORM 32.

Boarding House—Receipts and Expenditures.—A monthly report, form 33 (Fig. 179), covering the receipts and expenditures on account of

UTAH FUEL COMPANY									
BOARDING HOUSE REPORT, _____					Mine Month of _____ 191__				
EXPENDITURES		AMOUNT		RECEIPTS		AMOUNT			
Meals on Hand from Last Month				Pay Roll Deductions					
Provisions				Bills Collectible on Mine Sup't for Cash					
Groceries				" " "					
Meals									
Milk									
Less Meals on Hand									
Labor									
Manager's Salary (prop'n of)									
" Expenses " "									
Cooks—Number of									
Waiters " "									
Junkies " "									
Other Expenses									
Coal Time at				Free Meals Furnished					
Laundry				" " "					
Cooking Utensils				" " "					
Furniture and Repairs				Charged to Mine Expenses and Credited to Boarding House Receipts					
Total Expenditures				Total Receipts					
Gain				Loss					
No. of Meals Served and Collected for on Pay Rolls				Amount Received for Each Meal Served					
" " " " " " by Bills Collectible				Cost per Meal, Provisions					
" " " " " " Free to Employees				" " Labor					
Total Meals Served				" " Other Expenses					
				Total Cost					
				Gain or Loss per Meal					
Correct, _____				Correct, _____					
Boarding House Manager				Mine Superintendent					

FIG. 179.—FORM 33.

the boarding house is made out in triplicate by the mine clerk. Original to the Auditor, duplicate to General Manager, triplicate to Boarding-house manager. This report is made up from and checks with the boarding-house accounts in the ledger.

RECORD OF RENTS COLLECTED AT _____ MINE

Owner _____		House No. _____		Owner _____		House No. _____				
MONTH 191	LESSEE	CHECK NO.	RENT THIS MONTH	HOW COLLECTED		CHECK NO.	RENT THIS MONTH	HOW COLLECTED		REMARKS
				PAY ROLL	CASH			PAY ROLL	CASH	
January										
February										
March										
April										
May										
June										
July										
August										
September										
October										
November										
December										

Fig. 180.—FORM 34.

Rent Record.—A record is kept on form 34 (Fig. 180), of the rent account with each dwelling house of the company, showing the lessee, check number, rental value, how collected and remarks. Entries are made on these records when houses are assigned to employees and again when they are vacated. The monthly rent is posted from and to the Pay-roll or Cash Book as the case may be.

Statement of Rent Account.—A Statement of the Rent Account is made out monthly on form 35 (Fig. 181), by the Mine Clerk and forwarded to the Auditor with the Pay-roll. This statement covers the amount of rent collected, how collected, house number and lessee. All dwellings are listed on this statement in numerical order and if vacant a notation is made in the remarks column.

Form 470, 12-5-10 1m-R. P.										FUEL COMPANY									
Statement of Rent Account at										Mine, Month of 191									
House No.	Occupied by	Rent this Month	How Collected						Remarks										
			Pay-roll		Cash		Bills Collectable												

RENT ROLL

..... Mine

..... 191

INSTRUCTIONS

Show every house number in consecutive order each month, whether occupied or vacant, and if vacant so report it.

This statement should show all rents and agree with collections on Pay-rolls, Cash and Bills Collectable and record kept at the mines.

Bills Collectable must be made and forwarded to this office through regular channel for all rents due and not paid through Pay-roll deduction or Cash.

When rent is less than a full month give number of days and explanation under head of "Remarks."

Rents refunded by vouchers account over collections should be shown in red, giving name of lessee, etc.

Send statement to Auditor, with distribution of Pay-rolls, each month.

See other Side for Instructions
CORRECT:

.....
Mine Supt.

FIG. 181.—FORM 35.

Animal Report.—A monthly statement covering all animals at the mine is made out on form 36 (Fig. 182) and forwarded to the General Manager, showing Name, Condition, working or idle, etc., on the reverse side of this statement is a recapitulation showing, animals at work, on the range, killed or sold, etc.

Form 554-2m—7-9-10		FUEL COMPANY									
ANIMAL REPORT											
Report of Horses and Mules at..... Mine For.....191.....											
No.	Name	Kind	Ht.	Age	Wt.	Condition	Work or Idle	Killed or Injured	Name of Man in Charge	Sold or Transferred	
										To	Amt.

RECAPITULATION				
Animals at mines first of month.....				
Animals on range first of month.....				
Animals purchased during month.....				
Animals killed and Sold during month.....				
Animals transferred during month.....				
Animals at mines last of month.....				
Animals on range last of month.....				
Total on hand.....				

No. of Animals injured during month.....				
No. of Animals died during month acct. sickness.....				
No. of Animals died during month acct. injury.....				
Average No. of Animals working during month.....				
Average No. of Animals idle at barn during month.....				
Average No. of Animals on range during month.....				
Total No. last of month.....				

NOTE: Give cause of Death or injury to each Animal

REMARKS.....

.....

.....

Correct.....	Approved.....	Veterinarian.....
Mine Supt.		

FIG. 182.—FORM 36.

Animals—Killed and Sold.—A monthly report of Animals killed and sold is made out in duplicate by the mine clerk on form 37 (Fig. 183).

The original copy goes to the Auditor. Animals purchased are shown on the debit side and animals killed or sold shown on the credit side. This report is a detailed statement of the Animals Killed and Sold Account in the ledger.

REPORT OF ANIMALS KILLED AND SOLD at..... Mine.....			
Balance from last month		Balance from last month	
Balance		Charge Hauling	
Animals at mine first of month			
Animals on range first of month			
Animals purchased during the month			
Animals Killed & Sold during month			
Animals at mines last of month			
Animals on range last of month			
Total on hand			
To.....		Correct.....	

FIG. 183.—FORM 37.

Forage Report.—A monthly report (form 38, Fig. 184) is made out showing the receipts and consumption of Hay and Grain during the month, Medicines, Barn labor, etc. The original copy goes to the General Manager and the duplicate to the Auditor.

Nationality Report.—At the end of each month a Nationality report is made out in triplicate covering the force employed. The information for this report is taken from the pay-rolls where the nationality of each man is noted. Original copy goes to the Auditor, duplicate to the General Manager and triplicate to the Superintendent. See form 39 (Fig. 185).

Daily Report of Mine Operations.—At the end of each day's run a daily report of operations is made out in triplicate (form 40, Fig. 186). The original copy going to the Auditor and the Duplicate to the General Manager.

This report covers the Force employed, Animals working, Shots fired and missed, Cars dumped, Trips run, Amount of Coal mined, shipped and on hand according to grades, also the time the mine worked, delays and the cause.

Daily Report of Coke Oven Operations.—A daily report covering the operation of the Coke Ovens is made out in triplicate (form 41, Fig. 187). The original copy goes to the Auditor, the triplicate to the General Manager.

UTAH FUEL COMPANY							
Report of Barn Supplies and Service At					Mine		191
	POUNDS GRAIN			POUNDS HAY			
	BARLEY	CORN	OATS	ALFALFA	WILD	YINGSTHY	
On Hand First of Month							Aver. No. Animals Fed Per Day
Received During "							" " " Working in Mine
TOTAL							" " " Outside
Fed During Month							" " " Not Working
Sold " "							
TOTAL							No. Animals Killed
							" " Injured
On Hand Last of Month							" " In Barn
Fed Per Animal Per Day							" " In Pasture
Total Amount Expended for Labor \$							
" " " " Medicine \$							
Cost Per Animal Per Day:	Grain	Hay	Labor	Medicine	Total		
Medicine on Hand Last of Month							
Correct				Approved			
Mine Sup.				Veterinarian			

FIG. 184.—FORM 38.

UTAH FUEL COMPANY

Report of Men Employed at-----

Mine-----

191--

NATIONALITIES	Miners in Mine	Day Men in Mine	Day Men Outside	Supt. Mine Foreman Clerks, Oper. Janitor	Coke Oven Men	Men on Construction Work			TOTAL
American									
German									
Finn									
Swede									
Austrian									
Sloak									
French									
Italian									
Greek									
Negroes									
Mexican									
Japanese									
Chinese									
TOTALS									

Original to

Duplicate to

Triplicate to

Auditor

Gen'l Mgr.

Gen'l Supt.

Mine Supt.

FIG. 185.—FORM 39.

Form 9-10M-2-7-11-R. P. Co.

UTAH FUEL COMPANY

Daily Report of Mine Operations

Mine No.

191.....

Men Employed	Inside	Out- side	Total	Miscellaneous	No.
Miners				Animals in Mine	
Drivers				" Outside	
Trappers and Couplers				" Not Working	
Hoist and Ropemen				" On Construction Work	
Other Day-men				Shots Fired	
				Shots Missed	
Machinists and Helpers				Mine Cars Dumped (Coal)	
Pumpmen				" (Rock)	
Engineers and Firemen					
Crushermen				Trips Made by	Hoist
Pumpers and Pushers				" "	"
Couplers				" "	"
Coal Loaders				" "	"
Other Day-men				" "	"
				" "	"
Construction Work				" "	"
Boarding House					
Supt., Mine Foreman					
Clerks and Janitor					
TOTAL					

COAL MINED, SHIPPED AND ON HAND NOT BILLED OUT

Kind of Coal	Mined			Shipped		On Hand	
	Cars		Tons	Cars	Tons	Cars	Tons
	Coal	Box					
Commercial Lump							
Railway " "							
Run of Mine							
Smelter							
Nut							
Slack							
Dust							
Dust Wasted							
Coal to Boilers (kind)							
Coal to Coke Ovens							
Local Scales (kind)							
Railway Engines (kind)							
Company Mine Buildings							
Rock and Waste							
TOTALS							
Mine Worked	Hours	Min					
" Idle	"	"		Account			
" "	"	"	"				
" Delayed	"	"	"				

FIG. 186.—FORM 40.

This report covers the Force employed and statistics regarding the operation of the ovens, the production and disposition of coke according to grades, etc.

Form 489-1-12-11-2M-R. P. Co.

UTAH FUEL COMPANY

Daily Report of Coke Oven Operations.

Sunnyside,191.....

		First Class	Gas Coke	Screenings	Total
Production					
Disposition	Loaded in R. R. Cars				
	Docked				
	Total				
Brought Forward					
Total					
Coke Billed		Cars	Cars	Cars	Cars
Balance on Hand	Loads Unbilled				
	Part Loads				
	On Docks				
	Total				

			Men Employed	
No. Ovens Pulled and Charged			Superintendent	
No. Ovens Pulled Only			Foremen	
No. Ovens Charged Only			Clerks	
No. Ovens Idle Account Repairs			Weightmen	
No. Ovens Lost Account Not Ready			Bin Men	
No. Ovens Lost Account			Larry Men	
No. Ovens Lost Account			Cart Men	
No. Ovens Burning			Car Droppers	
No. Ovens in Operation			Blacksmith and Helpers	
No. Ovens Not in Operation			Mason and Helpers	
Total Number of Ovens			Track and Water Men	
Slack Record			Plastering Oven Doors	
			Other Day Men	
Brought Forward	Cars	Tons	Total Company Men	
Slack Dumped			Levelers	
Total			Coke Pullers	
Slack Charged			Coke Loaders	
Balance in Bins			Total Number Men	

Remarks: _____

Superintendent of Coke Ovens

FIG. 187.—FORM 41.

Monthly Report of Operations.—This report (form 42, Fig. 188) is made out in triplicate at the end of each month, the original copy going

Forms 226 2 M 3-15-11 R. P. Co.

UTAH FUEL COMPANY

Average Report of Operations.....*Mine No.*.....*Month of*.....191.....

Mine Operations	This Month Average Tonnage	Last Year		Mine Operations	This Month Average Tonnage	This Month Same Month Last Year
		Same Month	Average Tonnage			
No. days mine worked				Avg. No. trips made by		
Total tons coal mined				Hoist		
Total mined from pillars				"		
" " " entries and rooms				"		
Average No. men in mine				"		
Miners				"		
Day Men				"		
Drivers				"		
Hoist and rope men						
Trappers and couplers				No. cars loaded		
Animals in mine				Coal		
Average No. men outside				Box		
Day men				Percent. coal cars		
Coal loaders				" box cars		
Dumpers and top men				Commercial lump		
Couplers				Railway lump		
Engineers and firemen				Run of Mine		
Men hauling props				Nut		
Powder used				Slack		
Pounds Hercules				Dust		
" black				Local Sales		
No. shots fired				Coal to boilers		
" " missed				Dust wasted at mines		
No. mine cars dumped coal				Rock and waste		
" " " " waste				Hours idle account of		
No. hours delayed acct.						
COKE OVENS				COKE OVENS		
Avg. No. Co. day men				No. days ovens worked		
" " coke pullers				" tons coal charged		
" " Levelers				" " coke made		
" " Loaders				Avg. tons made per day		
" " storing coke				Percentage of coke to coal		
No. cars coke loaded				Avg. No. ovens charged		
No. ovens delayed acct.				" " " drawn		
				No. tons coke stored		

FIG. 188.—FORM 42.

UTAH FUEL COMPANY INCLUDING PLEASANT VALLEY COAL COMPANY										Daily Report of Shipment from				Mine		191		No.			
CONSIGNEE	DESTINATION	Shipped Per Tons	Wt. Bill No.	Kind	CASE		WEIGHT IN POUNDS		Kind of Coal	EARNINGS		Freight Rate	Freight Amount	REMARKS							
					Initial	Number	Gross	Net		Rate	Amount										
1														1							
2														2							
3														3							
4														4							
5														5							
6														6							
7														7							
8														8							
9														9							
43														43							
44														44							
45														45							

RECAPITULATION		COMMENTS:	
Pounds	Earnings		
TOTAL COAL		Above Coal Received and Bill of Lading	
TOTAL COKE		Mine Superintendant	
TOTAL SHIPMENTS		Railroad Agent	

FIG. 190.—FORM 44.

[illegible]

FIG. 191.—FORM 45.

UTAH FUEL COMPANY			
REPORT OF COAL MINED AND DISTRIBUTION			
Mine No. _____		Month of _____ 19__	
MINED		Total Product Pounds	Total to Acct for Pounds
Balance on hand from last month,			
Mined by Miners, Pay Roll,			
Mined by Company, Day Men,			
Mined Plus Percentage Deducted,			
Total,			
Less Loss in Weights,			
Plus Gain in Weights,			
Total,			
DISTRIBUTION			
Shipments,	Lump		
"	Run of Mine		
"	Nut		
"	Slack or Screenings		
"	Dust		
D. & R.G. R.R. Engines at Mines (Per Coal Tickets)	Lump		
" " " " " " "	Run of Mine		
Sold at Mines (Per Local Sales Report)	Lump		
Free Coal (See reverse side for detail)			
Coal to Boilers,			
" " Boarding House	Lump		
" " Store and Office Building,	"		
" " Various Mine Buildings,	"		
Coal to Coke Oven Bins,	Slack		
Coal on Hand in R.R. Cars	Lump		
" " " "	Run of Mine		
" " " "	Nut		
" " " "	Slack or Screenings		
" " In Bins,	Slack		
Total,			
COKE		POUNDS	POUNDS
Coke on hand from previous month			
Coke Made			
Total to Ship			
Amount Shipped			
Balance on Hand			
Coke screenings shipped			
No. Days Mine Worked _____		Correct: _____ Mine Supt. _____	

STATEMENT OF FREE COAL FURNISHED					(Reverse Side)
NAME	OCCUPATION	KIND	WEIGHT	REMARKS	
Total,					

FIG. 194.—FORM 48.

Coal and Coke Mined and Shipped.—A daily record of the production and shipments of both coal and coke is kept on form 45 (Fig. 191). This record shows the production according to grade, also the shipments according to grade.

Record of Operations Mine.—This record is in book form. In it are recorded each day the production of Coal according to grades, the

ESTIMATED COAL AND COKE TONNAGE AND EARNINGS												
Date	1903, from						Mine					
COAL	TONS	EARN'GS	TONS	EARN'GS	TONS	EARN'GS	TONS	EARN'GS	TONS	EARN'GS	TONS	EARN'GS
Overseas												
Utah points via R.G.W.R.												
" " " O.S.L.R.R.												
Calif. points via D.S.R.R.												
" " " C.M.R.												
Idaho " " O.S.L.R.R.												
Montana " " "												
Washington " "												
Oregon " " "												
Nevada " " So. Pac.												
California " " "												
TOTAL												
R.G.W.R.												
D.S.R.R.												
C.M.R.												
O.S.L.R.R.												
So. Pac. Co.												
TOTAL												
Coal to Coke Ovens C.G.												
" " " S.S.												
" " " B.S.												
" " " W.O.												
" " " C.G.												
" " " S.S.												
" " " B.S.												
Coal sold at Mines												
Coal Unassigned												
TOTAL												
TOTAL COAL												
COKE												
Utah Smelters												
" " Other Industries												
Idaho												
Montana												
Nevada												
California												
TOTAL												
TOTAL COAL AND COKE												
REMARKS:												

FIG. 195.—FORM 49.

Force employed, and misc. information regarding Animals, Shots Fired, etc. The information for this record comes from the Daily Report of Operations. See form 46 (Fig. 192).

Record of Operations Coke.—This record is in book form. In it are recorded each day from the Daily Report of Coke Oven Operations, the

The following accounts are carried on the general ledger:

- | | |
|-----------------------|-----------------------------------|
| 1. Treasurer | 10. Pay-roll |
| 2. Buildings | 11. Coupons, books and Stationery |
| 3. Store Fixtures | 12. Coupons Outstanding |
| 4. Teams and Wagons | 13. Taxes |
| 5. Merchandise Bought | 14. Insurance |
| 6. Merchandise Sold | 15. Depreciation account |
| 7. Expense | 16. Individuals and Companies |
| 8. Earnings | 17. Profit and Loss |
| 9. Vouchers | |

1. Treasurer.—This account is handled by the Auditor the same as Cash. When Vouchers are paid the Treasurer is credited and Vouchers charged.

2. Buildings.—This account covers the cost of all buildings owned by the store company.

3. Store Fixtures.—This account covers the cost of all store fixtures and furniture of the company.

4. Teams and Wagons.—This account covers the cost of all Teams, Wagons and Harness of the company.

5. Merchandise Bought.—All merchandise purchased for the various stores of the company is charged to this account through the Abstract of Vouchers.

6. Merchandise Sales.—All sales at the stores are credited to this account. Charge sales being charged to Individuals and Companies; Coupon sales being charged to Coupons Outstanding and cash sales are charged to Treasurer, this account being handled exactly the same as the cash account. In closing the books, this account is closed into the Merchandise Bought account, in order to arrive at the actual gross earnings. The balance at the credit of this account (Merchandise sales) represents the sales at cost.

Sales Report.—A weekly report is made out in triplicate on form 51 (Fig. 197), at each store. The disposition of these reports is explained on the forms. This report covers the sales, receipts, and remittances in detail.

7. Expense Account.—This account gives all salaries of store employees and all other expenses incurred for the operating or maintaining the stores of the company including depreciation charges.

8. Earnings.—The monthly gross earnings of the different stores of the company are estimated separately, based on the per cent. of gross earnings to sales for the previous six months, and entry is made charging Sales and crediting Earnings. Inventories are taken every six months and any adjustment necessary is made at that time.

9. Vouchers.—This account is credited with all Vouchers passed to the Treasurer for payment, as per the total of the Abstract of Vouchers

Form 200		WASATCH STORE COMPANY			
		MANAGER'S REPORT OF SALES, RECEIPTS AND REMITTANCES			
Of _____		Store for week ended _____		191 _____	
SALES					
Coupon Sales					
Ind. and Co.'s Sales					
Cash Sales, per Registers					
TOTAL					
RECEIPTS					
Cash on Hand					
From Coupon Sales					
" Ind. and Co.'s "Coupons"					
" " "Cash"					
" Cash Sales, per Registers					
Over or Short					
TOTAL					
REMITTANCES					
Acc't Coupon Sales Sent to Auditor					
" Ind. and Co.'s "Coupons" Sent to Auditor					
" " "Cash" Sent to Treasurer					
" Cash Sales " "					
Balance on Hand at Store					
TOTAL					
Original to Auditor with Coupon Remittance					
Duplicate to Treasurer with Cash Remittance					
Triplicate to Manager					
Correct:					
		Detail of Balance			
		Gold			
		Silver			
		Currency			
		TOTAL			
Store Manager					
191 _____					
Compare above figures with exhibit and see that they agree. Store managers will retain impression copy of this report.					

FIG. 197.—FORM 51.

when the Vouchers are paid this account is charged and the Treasurer is credited.

10. Pay-roll.—The store Pay-rolls are made up in the same manner as the mine Pay-rolls and are forwarded to the Treasurer for payment. Payment is made by checks and the Pay-roll account charged, the Treasurer being credited. The Pay-roll distribution is charged to expense account.

11. Coupons, Books and Stationery.—This account is charged with all coupon books purchased by the company, also with all store stationery bought. As coupons are issued they are charged to Individuals and

Companies A/C and credited to this account. The mining company collects through the Pay-roll for coupon books issued by the store company, and at the end of the month when these collections are forwarded to the store Treasurer, he reports the same to the Auditor, who makes a journal entry charging Treasurer and crediting Individuals and Companies A/C. Stationery is charged out to Expense account as used.

Coupon Report.—At the end of each month a Coupon Report is made out in triplicate on form 52 (Fig. 198) at each store. The disposition of these reports is stated on the forms. This report shows the coupons on hand the first of the month, amount received during the month, amount sold during the month, and balance on hand at the close of the month.

12. Coupons Outstanding.—The company issues coupons in book form to facilitate trading at the company's stores. When coupon books are issued to employees, an entry is made in a Coupon Register for this purpose, listing the name, Check number, House number, Coupon numbers and the value of the same. Employee's receipt for the coupons they receive opposite the entry in the register. All the amounts due the company for coupons issued are collected on the mine Pay-rolls. Coupons redeemed by the store company are remitted to the Auditor weekly.

On the general books in the Auditor's office, an entry is made each month charging Individuals and Companies, Coupon account, and Crediting Coupons Outstanding, with the total amount of Coupons issued during the month. An entry is also made charging Coupons Outstanding and crediting Merchandise Sales with the total amount of coupons taken in by the store, and remitted during the month to the Auditor.

13. Taxes.—The store company taxes are handled in the same way as those of the mining company, being pro-rated out one-twelfth each month to expense account.

14. Insurance.—The insurance account is handled in the same manner as the mining company handles theirs, being pro-rated out to Expense account one-twelfth each month.

15. Depreciation.—This account is credited with the various amounts charged off each month to Expense account, for the Depreciation of the Store buildings, Fixtures and Furniture, and Teams and Wagons. The rate of Depreciation is figured at 10 per cent. a year and the amount is pro-rated to Expense account one-twelfth each month.

16. Individuals and Companies.—This account represents the total Charged sales and is credited with total amounts paid on account each month.

17. Profit and Loss.—All operating and Income accounts are closed into this account at the end of each year.

A monthly Financial Statement is made up by the Auditor covering the operations of the company, of which the following is a copy.

WASATCH STORE COMPANY

Exhibit.....19.....

INCOME ACCOUNT

For the month of.....

Gross earnings	.....
Expenses	.....
Total net earnings from store	.....
ADD— Vouchers, Discounts, etc.	.....
TOTAL INCOME	.....
DEDUCT—Taxes	.....
Insurance	.....
Depreciation	.....
TOTAL NET INCOME	.....

INCOME ACCOUNT

Fiscal year to date

Gross earnings	.....
Expenses	.....
Total net earnings from stores	.....
ADD, Vouchers, Discounts, etc.	.....
TOTAL INCOME	.....
DEDUCT—Taxes	.....
Insurance	.....
Depreciation	.....
ADD, Actual earnings in excess of estimated earnings for six months ended.....as disclosed by inventory.....	.....
LESS, Dividend No.....declared and paid in.....	.....
NET INCOME	.....

PROFIT AND LOSS ACCOUNT

By balance at credit of Profit and Loss account	.....
Income as above	.....
To dividend No.....	.....
Balance	.....
By balance to credit of Profit and Loss account	.....

BALANCE SHEET

Current Asset.

Fire Insurance (not charged out)	.....
Coupon books and Stationery	.....
Due from Indvs. and Companies	.....
Coupons sold mine employees	.....
Due from Bills Collectable	.....
Due from Utah Fuel Co.	.....
Cash on hand at stores	.....
Cash in hands of Treasurer	.....

CURRENT LIABILITIES

Vouchers	.....
Pay-rolls	.....
Coupons Outstanding	.....	.....
General Accounts		
Merchandise	.....
Store Fixtures	.....
Teams and Wagons	.....
Buildings	.....
Less depreciation	.....	.....
Capital Stock		.....
Deferred Accounts		
Unpaid Taxes	.....
Profit and Loss	.....	.....

CHAPTER V

MINING AND MILLING GOLD ORE

ACCOUNTING METHODS OF THE PORTLAND GOLD MINING COMPANY

In the Cripple Creek District of Colorado, the Gold bearing ores, which are tellurides, occur in a system of veins and irregular replacement ore bodies. The veins have an almost vertical dip and are generally narrow.

The development of these Gold deposits is by vertical shafts, levels being run from the shafts at regular distances. The vein rock is broken down in the stopes with Air Drills, it is then loaded into tram cars, and trammed to the shaft, where the cars are run onto a cage and hoisted to surface. At surface the cars go directly into the Ore Houses and are dumped, all the ore is screened, the coarse ore being washed and hand sorted before shipment. First class ore is shipped direct to the smelter, the other ore is sold to the company's mills the same as if it was going to a custom mill, a regular treatment charge being made.

Ore when received at the mill goes first to the crushers and then to the concentrating tables. From the tables the concentrates go to the Barrel House and are diverted into tube mills and slimed with a cyanide solution, the pulp passes to several filter presses for filtering. The rich gold solution from these presses is precipitated on zinc dust.

The resulting precipitates and concentrates are reduced to bullion.

The Portland Gold Mining Company operates two mills, one at the mine and one at Colorado Springs, Colo. In their method of accounting, each mill and the mine are independent.

Books of account are not kept at either mine or mills except a "Petty Cash" Book, but bookkeeping is done at the Head Office.

The accounts for the Victor Mill only are shown.

THE COST OF GOLD AT THE MINT

Loss and Gain					
Administration	Gold	Stopping		Gold at Smelter	Profit on Sales
		Smelting	Freight		
Salaries		Development			
Insurance		Milling			
Taxes		Permanent Equip't.			
Legal Expense					
Miscellaneous					
Office Expense					
		Smelting		Concentrates at Mill	
		Freight		Freight	
		Ore		Ore	
				Milling	
				Coarse Crushing	
				Conveying and Sampling	
				Fine Crushing	
				Concentrating	
				Classifying	
				Tube Milling	
				De-watering	
				Agitating	
				Precipitating	
				Melting	
				Filtering	
				Solution	
				Tailings Expense	
				Assaying Expense	
				Bullion Expense	
				Concentrates	
				Stopping	
				Breaking	
				Tramming	
				Timbering	
				Hoisting	
				Sorting and Loading	
				Other Expense	
				Shaft No. 1	
				Breaking	
				Tramming	
				Timbering	
				Hoisting	
				Sorting and Loading	
				Other Expense	
				Shaft No. 2	
				Breaking	
				Tramming	
				Timbering	
				Hoisting	
				Sorting and Loading	
				Other Expense	
				Shaft No. 3	
				Breaking	
				Tramming	
				Timbering	
				Hoisting	
				Sorting and Loading	
				Other Expense	

NOTE.—Debit accounts are underlined, items appearing below them may be either sub-accounts or direct charges.

HEAD OFFICE—LEDGER ACCOUNTS

General accounts	Sub-accounts
<ul style="list-style-type: none"> ✓ Capital Stock ✓ ✓ Securities ✓ ✓ Property ✓ ✓ Cash ✓ Vouchers Payable Accounts Receivable 	
Permanent Equipment : ✓	<ul style="list-style-type: none"> Buildings Machinery Headworks Cars and Rails Pipe Lines Tools and Appliances Stable Account Office Appliances
Loss and Gain	
Dividends	
Mining Expense : ✓	<ul style="list-style-type: none"> Breaking Ore ✓ Tramming Timbering Hoisting Sorting and Loading Pumping Lighting Assaying and Sampling Surveying Repairs General Expense
Furniture and Fixtures	
Drainage Tunnel	
Victor Mill ✓	<ul style="list-style-type: none"> Coarse Crushing ✓ Conveying and Sampling ✓ Fine Crushing Concentrating Classifying Tube Milling De-watering Agitating Precipitating ✓ Melting Filtering ✓ Solution Tailings Expense Assaying Expense Bullion Expense Concentrates

HEAD OFFICE—LEDGER ACCOUNTS

General accounts	Sub-accounts
Portland Mill	
Gold Account	
Pay-roll	
Supplies	
Litigation	
Unclaimed Wages	
Unclaimed Dividends	
General Expense.....	<div> <div> Officers' Salaries Insurance Taxes Legal Expense Miscellaneous </div> <div> Office Expense.. <div> Salaries Rents Stationery and Printing General Expense </div> </div> </div>

✓ **Capital Stock.**—To this account is credited the amount of the Capital Stock of the company (par value). The debit for this journal entry might have been to "Subscription," "Treasury Stock" and (or) "Property," depending entirely upon the way the property was originally purchased and the disposition of the stock at the time the company was organized.

✓ **Securities.**—This account is charged with all investments in the stocks or bonds of other corporations, and will be credited with the proceeds of the sale of such securities.

✓ **Property.**—This account is charged with the original cost of the mining property, also the cost of additional lands purchased.

✓ **Cash.**—This account is handled in the usual manner, showing the receipts, disbursements and balance on hand each month.

✓ **Vouchers Payable.**—This account is credited with the footing of the Voucher Register for the month and is debited with all Vouchers paid during the month as per Cash Book.

✓ **Accounts Receivable.**—This account shows the amount due the company in the aggregate. Separate accounts are kept with each individual or corporation with whom an account is opened.

✓ **Loss and Gain.**—The following accounts are charged into this account each month by journal entry:

Mining Expense
Victor Mill
Portland Mill

General Expense
Gold.

When the surplus credits of this account are of such proportions as to warrant the Directors in declaring Dividends, the amount so declared is debited to this account and credited to the "Dividend" account.

✓ **Dividends.**—This account is charged with all dividends declared by the company and paid to stockholders.

✓ **Permanent Equipment.**—This account is charged with all Plant Account expense each month as per Superintendents' reports. The following sub-accounts are carried for the mine:

Buildings	Pipe Lines
Machinery	Tools and Appliances
Headwork	Stable Account
Cars and Rails	Office Appliances.

Accounts are also carried for each mill.

✓ **Mining Expense.**—This account is charged with Stoping and Development expense as shown by the Mine Agent's report each month. The following sub-accounts are carried:

Breaking Ore	Lighting
Tramming	Assaying and Sampling
Timbering	Surveying
Hoisting	Repairs
Sorting and Loading	General Expense.
Pumping	

✓ **Furniture and Fixtures.**—This account is charged with all office furniture including desks, tables, chairs, typewriters, adding machines, check perforators, etc.

✓ **Drainage Tunnel.**—This account is charged with all payments made on account of the construction of the Deep Drainage Tunnel which will furnish permanent drainage for the mine below the present working levels.

✓ **Victor Mill.**—This account is charged with all milling expenses each month as per reports of the Mill Superintendents. The following sub-accounts are carried:

Coarse Crushing	Precipitating
Conveying and Sampling	Melting
Fine Crushing	Filtering
Concentrating	Solution
Classifying	Tailings Expense
Tube Milling	Assaying Expense
De-watering	Bullion Expense
Agitating	Concentrates Expense.

✓ **Portland Mill.**—This account is handled the same as the above.

✓ **Gold Account.**—This account is intended to cover the income received from the sale of all product of the mine and mills, and represents the earnings of the company from production.

✓ **Pay-roll.**—This account is credited with the amount of the pay-rolls as forwarded from the mine and mills and charged to their accounts;

when the checks are drawn for these amounts the total sums are charged to this account from the Cash Book.

✓ **Supplies.**—All supplies for the mines and mills are charged to this account through the Voucher Register, and credit is given this account for all supplies used by the mine and mills as per the monthly Cost Sheets.

✓ **Litigation.**—The expenses of all litigation goes into this account, and an estimated monthly proportion is charged out each month to Legal Expense.

✓ **Unclaimed Wages.**—This account is credited with all unclaimed wages of workmen which have not been called for during a period of six months.

✓ **Unclaimed Dividends.**—This account is credited with all dividends remaining unclaimed for a period of six months.

✓ **General Expense.**—This account comprises the following sub-accounts:

✓ **Officers' Salaries.**—This account is intended to cover the salaries of corporation officers only.

✓ **Insurance.**—This account is charged with a monthly proportion of the insurance premiums falling due in the year. The credit for this charge is to the "Insurance Suspense" account.

✓ **Taxes.**—This account is charged with a monthly proportion of the Taxes for the year. The credit for this charge is to the "Taxes Suspense" account.

✓ **Legal Expense.**—This account is charged with all Counsels' fees, Legal retainers, and all expenses incident to any litigation of the company.

✓ **Miscellaneous.**—This account is intended to cover Directors' fees, traveling expenses, and all expenses not covered by the above accounts.

✓ **Office Expenses.**—This account is intended to cover all expenses of the General Office itself, and is shown under the following sub-divisions.

✓ **Salaries.**—To cover office help.

✓ **Rent.**—To cover the rent of the General Office.

✓ **Stationery and Printing.**—To cover all books, stationery, printed matter of all kinds and postage.

✓ **Miscellaneous.**—To cover all General Office expenses not covered by the above, such as Telephone, light, general supplies, etc.

In the annual report to stockholders a Financial Statement is shown as follows:

SECRETARY AND TREASURER'S REPORT

Operation for 1911

Gross value of Ore mined and shipped	.....
Gross values recovered by New Mill	.....
Net cost of Mining and Milling	.....
Gross profit on operations	.....

Operation Continued

Gross profit as above	.....
Interest Discount and Exchange	.....
Revenue from other sources	.....
Net profit on operation of mine and mills	.....

Surplus or Profit and Loss Statement for 1911

Balance January 1, 1911	.....
Net profit as above	.....
Sundry losses on railroad claims	.....
Dividends paid	.....
Depreciation:	
Value in place of ore mined	.....
Mine Property	.....
Mill property	.....
New mill property	.....
Permanent Equipment	.....
Office Furniture and Fixtures	.....
Railroad Rolling stock	.....
Drainage tunnel	.....
Balance to 1912 account	.....

Cash Receipts and Disbursements for 1911

Balance January 1, 1911	.....
From operation of mine and mills	.....
Bills Receivable	.....
Sale of Junk and Revenue from all other sources	.....
Vouchers and Pay checks	.....
Dividends paid	.....
Balance January 1, 1911	.....

Balance Sheet, January 1, 1912

Cash on hand and in the bank	.....
Ore on hand at the mill	.....
Bills and Accounts Receivable	.....
Store and Supplies at mine and mills	.....
Property account:	
Mine	.....
Mill	.....
New Mill	.....

Permanent Equipment	.....
Railroad Rolling Stock	.....
Securities	.....
Furniture and Fixtures	.....
Drainage Tunnel	.....
Litigation and Engineering Suspense	.....
Insurance Prepaid	.....

Unclaimed Wages	.....
Unclaimed Dividends	.....
Unearned Treatment Charges	.....
Capital Stock	.....
Surplus, or Profit and Loss	.....

MINE ACCOUNTS—MINE BOOKS

General Accounts	Sub-accounts	Distributed Accounts
Stopping.....	<ul style="list-style-type: none"> Breaking Ore Tramming Timbering Hoisting Sorting and Loading Other Expense 	<ul style="list-style-type: none"> Carpenter shop and Surface Blacksmith Shop Machine Shop Boiler Room Compressing Machine Drills Auxiliary Hoists
Development.....	<ul style="list-style-type: none"> Drifts Crosscuts Raises and Winzes Shaft No. 1 Shaft No. 2 Shaft No. 3 	<ul style="list-style-type: none"> Hoisting Electric Plant Waste Haulage Ore House Tramming Timbering
Milling.....	<ul style="list-style-type: none"> Portland Mill Freight Tramming to Victor Mill Buildings Machinery Headwork 	<ul style="list-style-type: none"> Fuel Lumber and Timber Explosives Supplies Pumping Lighting
Plant Account.....	<ul style="list-style-type: none"> Cars and Rails Pipe Lines Tools and Appliances Stable Account Office Fixtures 	<ul style="list-style-type: none"> Assaying and Sampling Surveying Repairs General Expense Office Expense Victor Mill Account
Cash		
Vouchers Payable		
Accounts Receivable		
Pay-roll		
Supplies.....	<ul style="list-style-type: none"> Storehouse Explosives Lumber and Timber Fuel 	
Insurance		
Hospital		

✓ **Stopping.**—This account is made up of the following sub-accounts:

Breaking Ore	Hoisting
Tramming	Sorting and Loading
Timbering	Other Expense

Distribution Sheets.—For each mine opening, both stopes and in development work, that is active during the month, one of these sheets is made out, Fig. 199 Form No. 6. The information called for on these sheets is taken from the "Machine Men's Reports" (form 2), the "Trammer's Reports" (form 13), and the "Shift Reports" (form 4). Additional information which is not furnished on the above reports is taken from the books.

The total amount of the Stopping account on the ledger for the month, is equaled by the sum of the totals taken from the Stope Distribution Sheets for the same period. In the same way the Development account is equaled by the sum of the totals from the Development Distribution Sheets.

✓ **Development.**—This account is made up of the following sub-accounts:

Drifts	Shaft No. 1
Crosscuts	Shaft No. 2
Raises and Winzes	Shaft No. 3

✓ **Milling.**—This account is made up of the following sub-accounts:

Portland Mill
Freight
Tramming to Victor Mill

Plant Account.—This account is made up of the following sub-accounts:

Buildings	Pipe Lines
Machinery	Tools and Appliances
Headwork	Stable Account
Cars and Rails	Office Fixtures

✓ **Cash.**—Only a "Petty Cash" book is kept at the mine office.

✓ **Vouchers Payable.**—This account is credited with the footing of the Voucher Register for the month and is charged with vouchers paid for the month as per the Cash book.

Pay-roll.—This account is credited with the gross earnings of labor for the month as shown by the Pay-roll and is charged with the Pay-roll account paid as shown by the Cash book each month.

Accounts Receivable.—This account comprises the total amount due the company as per the individual accounts on the ledger.

Insurance.—This account covers deductions made from the gross earnings of employees, on account of workmen's collective insurance.

These deductions are 2 per cent. of the gross earnings in the case of underground men, and 1 1/2 per cent. for surface men. The compensation for this deduction is one-half pay for disability from accident; special indemnity being provided for fatal or more serious accidents.

✓ **Hospital.**—This account covers deductions made from the gross earnings of employees on account of "Hospital Insurance." Each employee is charged one dollar for each calendar month, receiving in compensation therefor surgical and medical attention in all cases of sickness or accident, together with hospital accommodations whenever necessary.

✓ **Supplies.**—This account is made up of the following sub-divisions:

Storehouse	Lumber and Timber
Explosives	Fuel.

MINE—SUB-ACCOUNTS

✓ **Breaking Ore.**—This account is made up of the following charges:

Machine men and helpers, labor	Explosives
Hand miners, labor	Machine Drills, proportion
Miners supplies	

This account is closed into Stopping each month.

Tramming.—This account is made up of the following charges:

Trammers, labor
Tramming (Distributed Account)—proportion

This account closed into Stopping and Development accounts each month on a tonnage trammed basis.

Timbering.—This account is made up of the following charges:

Timbermen and Helpers, labor
Lumber and Timber
Timbering (Distributed Account)—proportion

This account is closed out each month to Stopping and Development accounts on a basis of cost of work done.

Hoisting.—This account is made up of the following charges:

Engineers, labor	Skip Tenders, labor
Oilers, labor	Boiler Room for steam
Topmen, labor	Supplies
Cagers, labor	Repairs to Building and Equip

This account closed out each month to Stopping and Development accounts on a basis of tons hoisted.

Sorting and Loading.—This account is made up of the following charges:

Sorting ore, labor
 Loading ore, labor
 Trimming waste, labor
 Washing Ore, labor

Supplies
 Boiler Room for steam
 Repairs to Ore Houses and Equipt.

This account closes into Stopping each month.

Other Expense.—This account is made up of the following accounts:

Pumping
 Lighting
 Assaying and Sampling
 Surveying

Repairs
 General Expense
 Office Expense.

This account closes out into Stopping and Development accounts each month on a basis of tons trammed.

Drifts.—This account is made up of the following charges:

Miners and Helpers, labor
 Hand miners, labor
 Miners' supplies
 Explosives
 Machine Drills, proportion

Tramming, proportion
 Hoisting, proportion
 Timbering, proportion
 Other Expense, proportion.

This account closes out into Development account each month.

Cross-cuts.—This account is similar to the above.

Raises and Winzes.—This account is similar to the above.

Shaft No. 1.—This account is similar to the above.

Shaft No. 2.—This account is similar to the above.

Shaft No. 3.—This account is similar to the above.

Portland Mill.—This account consists of an arbitrary treatment charge assessed against the mine by the mills, for the reduction of the ores produced by the mine. The charge is based upon the assay value of each lot of ore, each day's shipment constituting a lot. The scale of charges follows the prevailing rates charged by the custom mills and smelters.

Freight.—This account is charged with the freight paid on shipments of ore to the Colorado Springs mill. It is distinct from the freight charges on supplies shipped in, which charges are debited directly to the supply accounts.

Victor Mill Tramming.—This account is charged with the labor of motorman and a proportion of the Electric Plant for power, and covers the cost of running a 5-ton motor car between the mine and the Victor mill.

Buildings.—This account is charged with all labor, supplies and other expenses incident to the construction of all buildings of a permanent nature. In making charges against this account, the particular building affected is specified so that the charge will go against the proper account.

This account closes into Plant Account each month.

Machinery.—This account is charged with the first cost of all machinery plus the freight on the same, and all labor and supplies incident to the erection of the same. In making charges to this account the particular piece of machinery of the plant affected is specified so that the charges will go against the proper accounts.

This account closes into Plant Account each month.

Headworks.—This account is charged with all labor and supplies incident to the erection of the Headworks at each shaft, including sheaves, etc. In making charges to this account the shaft affected is specified so that the cost of the different Headworks can be kept separate.

This account is closed into the Plant Account each month.

Cars and Rails.—This account is charged with the first cost of all Tram Cars, Motor Cars, and Rails.

This account is closed into Plant Account each month.

Pipe Lines.—This account is charged with all labor, supplies, etc., for the building of all water, air and steam lines. In making charges against this account the kind of a line being worked on is specified, in order to keep separate account of each kind of work. This account is closed into the Plant Account each month.

Tools and Appliances.—This account is charged with all hand tools and portable equipment used at the mine, such as Compressed Air Drills, Machine Shop Tools, Wood-working Machinery, Drill-sharpening Machines, etc.

This account is closed into the Plant Account each month.

Stable Account.—This account is charged with the first cost of all live stock, wagons, buggies, harness, automobiles, motor trucks, etc.

This account is closed into the Plant Account each month.

Office Fixtures.—This account is charged with the first cost of all typewriters, adding machines, check perforators, etc., also the office furniture, and fixtures.

This account is closed into the Plant Account each month.

Storehouse.—This account is charged with all supplies bought that are not Explosives, lumber and Timber or fuel. Supplies used are credited at the end of the month.

Explosives.—This account is charged with all explosives bought and at the end of the month are credited with all explosives used.

Lumber and Timber.—This account is charged with all lumber and timber bought and at the end of each month is credited with the amount used.

Fuel.—This account is charged with all the fuel bought and at the end of the month receives credit for the quantity used.

MINE—DISTRIBUTED ACCOUNTS

Carpenter Shop and Surface.—This account is charged with the following:

Carpenter Foreman, salary	Electric Plant for power
Carpenters, labor	Surface expense
Supplies	Repairs to Building and Equipt.

This account is closed out each month to the various accounts benefited on a basis of labor performed.

Blacksmith Shop.—This account is charged with the following:

Blacksmiths and helpers, labor	Fuel
Supplies	Repairs to Building and Equipt.

This account is closed out each month to the various accounts benefited on a basis of labor performed.

Machine Shop.—This account is charged with the following:

Master Mechanic, salary	Electric Plant for power
Machinists and helpers, labor	Repairs to Building and Equipt.
Supplies	

This account is closed out each month on a basis of labor performed to the various accounts benefited.

Boiler Room.—This account is charged with the following:

Firemen, labor	Water (paid by voucher)
Fuel	Repairs to Building and Equipt.
Supplies	

This account is closed out each month on a basis of steam used. Each engine is equipped with a revolution counter, and the Master Mechanic furnishes the clerk with a distribution of the steam used; figured from the size of the engines and the revolutions made during the month.

Compressing.—This account is charged with the following:

Engineers, labor	Boiler Room for steam
Supplies	Repairs to Buildings and Equipt.

This account is closed out each month on a basis of Air used, it generally goes entirely to the Machine Drill account.

Machine Drills.—This account is charged with the following:

Repairs to Drill Machines
Sharpening Steel, etc.
Compressor for air used.

This account closes out into Stopping and Development sub-accounts each month on a basis of Drill Shifts worked by the machines.

Machine Man's Report.—Each machine drill miner makes out one of

these reports for the shift he works, Fig 200, form No. 2. These reports show the place working and give a complete record of the progress of drilling, steel received and dulled, explosives received and used, a distribution of their working time, notes on any breakages, also complaints.

These reports go to the Mine Foreman, and are later turned over to the Mine Office.

Form M 2 2-24-12—25M		
The Portland Gold Mining Co.		
MACHINE MAN'S REPORT		
Shaft No. Level M. Shift		
Place		
Kind and Size of Drill Used		
Number of Holes Total Feet Drilled		
Number of Drills Received		
Number of Drills Dulled		
Powder Received Sticks		
Powder Used Sticks		
Number Ft. Fuse Received		
Number Ft. Fuse Used		
Time Actual Drilling Hours		
Mucking Hours		
Barring Down Hours		
BREAKAGE:		
Machine		
Drills		
Timbers		
COMPLAINTS:		
Air Line		
Poor Steel		
Air Pressure		
Poor Machine		
No Timbers		
Missed Holes		
REMARKS:		
DATE		
NAME		
Machine Man.		

FIG. 200.—FORM 2.

The information contained in these reports is posted daily to the Distribution Sheets for the various underground openings affected.

Auxiliary Hoists.—This account is charged with the following:

Engineers, labor
Cagers, labor

Supplies
Boiler Room for steam.

As these "Dinkeys" or third compartment hoists are used principally for lowering timber, and handling steel both in and out of the mine, the account generally closes out to "Timbering" and "Machine Drills."

Hoisting.—This account is charged with the following:

Engineers, labor	Boiler Room for steam
Oilers, labor	Supplies
Topmen, labor	Shaft Repairs
Cagers, labor	Repairs to Building and Equipt.
Skip Tenders, labor	

In making charges to this account the following sub-divisions are made, Hoisting, Top Trimming, and Shaft Repairs.

This account is closed out each month to Stopping and Development accounts on a basis of tons hoisted.

Hoist Report.—The Top man at each shaft makes out for each shift a Hoist Report, Fig. 201, form No. 23. These reports show the material hoisted and the grade, also the levels from which it comes. These reports and the Trammer's Reports for the same shaft and shift must check.

The Portland Gold Mining Co.									
HOIST REPORT, SHAFT NO. _____									
O'Clock Shift. _____ 191 _____									
Level No.	Cars of Ore	Cars of Mill Dirt	Cars of Waste	Water				Cars Waste Dumped in Old Stopes	Remarks
Tunnel,									
200									
400									
1000									
1100									
1200									
Totals									
Foreman. _____					Topman. _____				

FIG. 201.—FORM 23.

Electric Plant.—This account is charged with the following:

Machine Shop—Labor of electrician; repairs to plant
 Electric Power—commercial; (paid by voucher)
 Supplies—lamp renewals, transmission lines, repairs.

Account is closed out each month into accounts using electric power, such as Carpenter Shop, Machine Shop, Haulage System, and Lighting.

The basis of the distribution into these accounts is shown by watt-meter readings.

Waste Haulage System.—This account is charged with the following:

Haulage engineers, labor
Electric Plant for power
Repairs to tracks and equipt.
Operation and maintenance of Elevators and Belt Conveyors.

The following sub-divisions are shown for this account.

Motor cars
Elevators
Belt Conveyors.

This account out each month into "Ore Houses" (Tramming Waste).

Ore Houses.—This account is charged with the following:

Sorting Ore, labor	Boiler Room for steam
Loading Ore, labor	Supplies
Washing Ore, labor	Tramming Waste (Waste Haulage System).

The following sub-divisions are shown for this account:

Sorting	Tramming Waste
Loading	Washing.

This account is closed out each month into "Sorting and Loading" a sub-account of Stopping.

Tramming.—This account is charged with the following:

Supplies
Tram car repairs
Track Repairs.

This account closes out each month into "Tramming" a sub-account of Stopping.

Trammers' Tags.—Each trammer fills out and places on each car that he sends up a tag, Fig. 202, form No. 13. This tag shows the grade of material in the car, where it was trammed from, where to and whether it was taken from a chute, plat or rough bottom. When the men are tramming waste for filling in old stopes, they make out one tag for the rock trammed from and to the same places, if they are changed about to different places they make out separate tags to cover the different places. When trammers are doing other work than tramming they must state so on a tag showing what they are doing and the time in hours for each job.

The Portland Gold Mining Co.		
TRAMMER'S TAG		
_____ O'Clock Shift,		_____ 19__
Ore	Mill Dirt	Waste
Trammed from _____		
Level No. _____ and Run to _____		
Taken from		
Chute	Platt	Rough Bottom
To be delivered in Bin No. _____		
Trammer. _____		
<p>Trammers will indicate whether "Ore," "Mill Dirt," or "Waste," by putting an X underneath the word; the same with "Chute," "Platt," or "Rough Bottom." Fill in and date blanks, sign name and send out with car.</p> <p>If on other work than tramping, state number of hours.</p>		

FIG. 202.—FORM 13.

All these Trammers' Tags are taken up by the Cagers at the different shafts when the cars are dumped, at the end of the shift they are turned into the office, sorted out and counted, the count being entered on the Distribution Sheets for the various underground openings effected.

Timbering.—This account is charged with the following:

Supplies
 Delivering timber
 Auxiliary Hoists, proportion.

This account is closed out each month to "Timbering" a sub-account of Stopping.

Timberman's Report.—The Timbermen make out each shift a report, Fig. 203, form No. 12, for each place timbered during the shift showing the place and material used in detail.

These reports go to the Head Timberman who makes out for each place timbered during the month, a Timber Report, Fig. 204, form No. 24. The details of the daily reports are posted to these Timber Reports, showing for each day worked, the kinds and quantities of material used on the different jobs.

These reports go to the Supply Clerk at the end of the month, and have the cost of the timber entered on them.

Portland Gold Mining Co.	
TIMBERMAN'S REPORT	
O'Clock Shift _____	Date _____
Level _____	Stope or Drift _____
Posts	
Caps	
Sills	
Ties	
But Caps	
Stulls	
Leaving {	New
	Raised
Sprags	
Ladders	
Planks, Ft.	

Timberman

FIG. 203.—FORM 12.

[illegible]

FIG. 204.—FORM 24.

Fuel.—All fuel used is charged to this account. The Master Mechanic reports to the Supply Clerk the weight of coal used each month. This account is closed out to the different accounts benefited on a basis of fuel used.

Lumber and Timber.—This account is charged with all lumber, timber, poles, lagging, ties, ladders, wedges, etc.

This account is closed out each month to the various accounts benefited according to the value of the material used.

In making charges to this account, it is necessary to specify the job or place in order to make a proper distribution of the account.

Explosives.—This account is charged with all explosives used, that is, powder, caps and fuse, together with the cost of handling same.

This account is closed out each month to the various accounts benefited according to the value of the explosives used.

In making charges to this account, the particular opening to which the material goes is specified.

Ammunition Order.—Each Machine miner makes out an Ammunition Order, Fig. 205, form No. 11, for his day's supply of explosives. These orders are filled by the Powderman, the material being delivered to the proper working places.

THE PORTLAND GOLD MINING CO.			
AMMUNITION ORDER			
_____ O'Clock Shift.	_____ 190		
_____ Level.	_____ Place Working		
_____ Sticks 1½" Powder.			
_____ " ½" "	_____ " "		
_____ Lengths Fuse	_____ Feet Long.		
_____ " "	_____ " "		
_____ " "	_____ " "		
_____ Machine Man.			
<p style="font-size: small;">In sending in above order, Machine Men must fill out the blanks indicating the level and place working. Always sign your orders.</p>			

FIG. 205.—FORM I1.

The Powderman makes out a Powderman's Report, Fig. 206, form No. 3, for each opening that is active during the month. The Ammunition Orders are posted to these reports each day in detail showing the date, quantity and kind of powder, fuse and caps delivered.

These reports are turned in to the Supply Clerk at the end of each month and have the values entered on them, the information is then posted to the supply records, etc.

THE PORTLAND GOLD MINING CO.										Form M 3
POWDER MAN'S REPORT										
Month _____ 191 _____										
Level _____ Place _____										
Day	1½" Powder lbs.	1" Powder lbs.	Powder 80% lbs.	Powder 100% lbs.	Fuse, Feet	Water Fuse, Feet	Cap	Cap Protectors		
1										
2										
3										
4										
30										
31										

FIG. 206.—FORM 3.

Supplies.—This account is charged with all supplies used that are not covered by specific accounts, such as Timber and Explosives.

In making charges for supplies used the particular job must in all cases be stated, to enable the accounting clerks to make a proper distribution of the charges on the Supply Records.

This account is closed out each month to the various accounts benefited on a basis of the value of supplies used.

Pumping.—This account is charged with the following:

Pumpmen, labor
Supplies

Boiler Room for steam
Pump repairs.

This account closes out each month to "Other Expense," a sub-account of Stopping.

Lighting.—This account is charged with the following:

Electric Plant for light

Candles.

This account closes out each month to "Other Expense," a sub-account of Stopping.

Assaying and Sampling.—This account is charged with the following:

Assaying, labor
Sampling, labor
Supplies

Electric Plant for power
Fuel
Repairs to Building and Equip.

This account closes out each month into "Other Expense," a sub-account of Stopping, on a tonnage basis.

This account represents the cost of taking daily samples in each of the working stopes and development places, and keeping a record of same.

All assays made are reported on blanks used for that purpose, Fig. 207, form No. 10, showing the consecutive assay number, description of the samples, contents and values.

Portland Gold Mining Co.						Form M 10—5M—11-15-11	
ASSAY OFFICE						Victor, Colo., _____	
I hereby certify that the samples assayed for _____						gave the following results per ton:	
No.	Description	Gold os.	hdth.			Value \$	cts.
Office at PORTLAND MINES						Assayer _____	

FIG. 207.—FORM 10.

Surveying.—This account is charged with the following:

Engineers, salary
Assistants, labor

Supplies.

This account closes each month into "Other Expense," a sub-account of Stopping.

Repairs.—This account is charged with the labor and supplies used in making general repairs about the mine—repairs which are not directly chargeable to the accounts mentioned above, as noted. It closes out each month into "Other Expense," a sub-account of stopping.

General Expense.—This account is charged with the following:

Superintendent's salary
Mine Foreman's salary
Shift Bosses' salary
Supplies
Boiler Room for steam heat for buildings.

This account closes out each month into "Other Expense," a sub-account of Stopping.

Office Expense.—This account is charged with the following:

Chief Clerk, salary
Timekeeper, salary
Supply clerk, salary

Supplies
Telephone and Telegrams.

This account closes out each month into "Other Expense," a sub-account of Stopping.

Victor Mill Account.—This account is charged with the amounts of labor performed, and supplies furnished, for the benefit of the Victor mill. It closes out each month into "Accounts Receivable."

GENERAL STATEMENT OF ACCOUNTING

The only account books used at the mine are the

Petty Cash Book
Voucher Register, and
Pay-roll.

Cash Book.—All funds received by the company at the mine are entered in the Cash Book in the usual way. All cash payments are entered in the Cash Book, showing distribution. The cash book is closed each month, and the balance remitted to, or received from, the treasurer, as the case may be, in order to keep the amount of cash on hand at the mine office a constant sum.

Voucher Register.—Entry is made in this register of all vouchers chargeable to the operation of the mine, and which have the approval of the mine manager, such as salaries of foremen and heads of departments, bills for water and electric power, etc. The distribution of the vouchers into the accounts benefited is also noted on the register, whence it is entered onto the "General Office" column on the cost-sheet for proper distribution.

Engaging Labor.—All persons seeking employment with the company, apply to the head of the department they wish to work in and if they are engaged, the foreman sends them to the office, where the Timekeeper makes out for each man employed a card, Fig 208, form No. 29. These cards call for specific information which in all cases must be complete. They are filed in a card index, alphabetically arranged. When an employee severs his connection with the company his card is removed from the live file, the date and the reason for leaving is noted on the card and it is filed in another file for future reference.

Form M 29-5M-9-14-11			
Card No. _____			
Name _____			
Age _____	No. _____	Street, _____	Colo. _____
Nationality _____	Married _____	Years _____	Experience _____
Date Employed _____	191 _____	Occupation _____	Wages _____
Last Employer _____			
Reason for Leaving _____			
In Case of Serious Accident, Notify _____			
Address _____			
Insurance? _____	Signature _____		
Date of Leaving _____	191 _____	If Discharged, By whom _____	
Reasons _____	Remarks _____		

FIG. 208.—FORM 29.

When an employee resigns or is discharged, the foreman furnishes him with a Time Check, Fig 209, form No. 9. This check is an order on the Timekeeper to pay for a stated amount of time at a stated rate of pay. These orders are not negotiable.

No. _____ _____ 191 _____ Name _____ _____ Shifts at \$ _____ Occupation _____ Reason _____ _____	The Portland Gold Mining Co. No. _____ Time Check. To THE TIMEKEEPER, PORTLAND OFFICE: _____ 19 _____ Due _____ _____ Shifts at \$ _____ For _____ in Month of _____ _____ Shifts. _____ NOT NEGOTIABLE.
---------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

FIG. 209. FORM 9.

Upon presentation to the Timekeeper this check is compared with the Pay-roll and if correct the extension is made in the Pay-Roll, and a bank check issued in settlement of the person's account. The check number is entered in the Pay-roll; also the date of settlement.

Timekeeping.—The foremen of each department both on Surface and Underground keep the time of their men in ordinary monthly pocket time books. At the end of each shift these books are turned into the office, and the Timekeeper posts the time direct to the Pay-roll.

PAY ROLL—THE PORTLAND GOLD MINING COMPANY—MINE DEPARTMENT.															Pay Roll No. _____			
															19 _____			
No.	NAMES	OCCUPATION	PERIOD FOR WHICH PAID												Amount Due	No. of Pay Checks	REMARKS	
			Mon	Tue	Wed	Thurs	Fri	Sat	Sun	Mon	Tue	Wed	Thurs	Fri				Sat	Sun
1																		
2																		
3																		
4																		
5																		
6																		
20																		
30																		
			Total															
<p>I CERTIFY THAT THE ABOVE NAMED PERSONS HAVE BEEN DILIGENTLY EMPLOYED DURING THE TIME SPECIFIED IN THE PRESENCE OF THE PORTLAND GOLD MINING COMPANY, AND THAT THE OCCUPATIONS, RATES AND AMOUNTS ARE CORRECT.</p>			<p>APPROVED: _____</p> <p>MAILED: _____</p> <p>SUPERINTENDENT</p>															

Fig. 210.—Form 1.

The Carpenter Foreman makes out each day a Carpenter Shop Report, Fig. 212, form No. 5, giving a distribution of the labor of his men for the day. This report is turned into the mine office each evening.

The Master Mechanic makes out each day a report showing a distribution of the labor of his men for the day on Fig. 213, form No. 17.

THE PORTLAND GOLD MINING COMPANY

Portland, Colo., _____ 190__

CARPENTER SHOP REPORT

SHIFTS	@	OCCUPATION
		Carpenters in Shop_____
		Sawyers in Shop_____
		Sawyer Helpers in Shop_____
		Carpenters on_____
		Carpenters on_____
		Carpenters on_____
		Carpenters on_____
		Carpenters on_____
		Carpenters on_____
		Men Cutting Lagging_____
		Men Cutting Plank_____
		Men on Cribbing at_____
		Men on Cribbing at_____
		Men in Lumber Yard_____

		Foreman_____
		Total_____

Carpenter Foreman.

FIG. 212.—FORM 5.

This report which covers all men in the Master Mechanics department is sub-divided between the three shafts. This report is turned into the mine office each morning.

In order to facilitate the cost keeping methods each machinist makes out each day an individual report of his labor for the day, showing the various jobs that he has worked on and the number of hours spent on each. Fig. 214, form No. 16.

These reports are made out by the men and turned in to the Master Mechanic at the end of each shift.

The Master Mechanic condenses this information for making up his daily report. The detailed information is used in making up the cost for Shop Requisitions.

THE PORTLAND GOLD MINING CO.				
DISTRIBUTION OF LABOR IN MACHINERY DEPARTMENT.				
	No. 1 SHAFT	No. 2 SHAFT	No. 3 SHAFT	TOTAL
MACHINERY REPAIRS AND CONSTRUCTION. No.				
On Air Drill Repairs				
Machinist on Repairs				
Machinist on New Work				
Machinists' Helpers				
Boilermakers				
Boilermakers' Helpers				
Pipe and Chain Gang				
Electrician				
Apprentice				
MEN ON ENGINES AND COMPRESSORS. No.				
Hoisting Engine, Top				
Hoisting Engine, Underground				
Hoisting Engine, Auxiliary				
Engine Wiper				
Compressor				
Waste Haulage				
Ore Loading Engine				
MEN ON BOILERS. No.				
Firemen				
Boiler Cleaner				
PUMP MEN. No.				
Mine Pumps, Station				
Mine Pumps, Sinking				
Washer Pumps				
Head Pumpman				
BLACKSMITH SHOP. No.				
Blacksmiths				
Blacksmiths' Helpers				
SPECIAL HELP.				
Haulage System				
Cables				
Cleaning, Sorting, etc.				
.....				
.....				
.....				
Total Men				

FIG. 213.—FORM 17.

THE PORTLAND GOLD MINING CO.		
MECHANICAL DEPARTMENT		
	Hours	Total
No. _____ Hoist _____		
No. _____ Compressor _____		
No. _____ Boiler Room _____		
Dynamo Engine _____		
Electric Lines _____		
Waste Haulage _____		
Air Drills _____		
Air Lines _____		
Steam Lines _____		
Water Lines _____		
Tram Cars _____		

Date _____		
Name _____		

FIG. 214.—FORM 16.

Shop Requisitions.—As the company makes and finishes in their own shops a large amount of the supplies used at the mine and mills, a Shop Requisition, Fig. 215, form No. 18, is used to keep detailed track of the supplies and labor that goes to make up the total cost of the job.

Each job is given a number and a Shop Requisition is made out for it. This requisition is in two parts; when the job is complete the top part is sent with the material covered, to the parties ordering the same, the lower part being turned into the office.

The Blacksmith Foreman makes out a daily report, Fig. 216, form No. 7, showing the various jobs his men have worked on and the number of hours worked on each. This report is turned into the mine office each morning.

The Ore House Foreman makes out at the end of each shift a report, Fig. 217, form No. 14, showing the classification of his labor and the time worked on the different jobs. This report also shows the cars of waste to the dump and the cars loaded for shipment. This report is turned into the office at the end of each shift.

The Shift Bosses make out at the end of each shift for each shaft a Shift Report, Fig. 218, form No. 4, showing a distribution of underground labor to the various openings in which work is being carried on. The labor is also recapitulated under the heads of Stopes, Development and General Underground.

These reports are turned into the mine office at the end of each shift.

Storehouse Department.—All material for the mine and mills is procured through the Purchasing Agent.

As material is required to replenish the storehouse stock or for special jobs, the Storekeeper makes out a Requisition, Fig. 219, form No. 28, in duplicate, specifying the quantity and kind of material required. These Requisitions must have the approval of the Superintendent before being forwarded to the Purchasing Agent. The original copy goes to the Purchasing Agent, and the duplicate is placed on file.

Purchase Orders.—In the purchase of supplies the Purchasing Agent issues orders numbered in triplicate; the original copy goes to the seller, the duplicate to the files, and the triplicate to the mine or mill making the Requisition.

Material Received Register.—All shipments received, both freight and express, are entered in the Register of Material Received, Fig. 220, form No. 20. This register calls for full data covering the Date received, Freight bill date and number, Consignor, Number of Packages, and an itemized list of material showing quantity, kinds and weights, Purchase order number, also the freight charges.

Invoices.—All invoices are received by the Purchasing Agent and checked as to prices, extensions and footings; they are forwarded to the mine or mill concerned.

The invoice goes to the Storekeeper, who enters the date, costs, discounts, etc., in the Register of Material Received, against the various items covered by the invoice. If the goods have not been received the invoice is held until they arrive. The invoices are then O. K.'d by the Storekeeper for receipt of material and turned over to the mine or mill clerk for Vouchering. All invoices are entered in the Voucher Register and vouchered before payment.

Stores Records.—To keep an accurate detailed record of all stores purchased and used, also to carry a perpetual inventory, a stores card index is used, Fig. 221, form No. 21.

A separate card is made out for each article, kind or size of material as required. These cards are indexed and also grouped under class heads, such as Nails, Oils, lumber, etc., to facilitate the work of the storekeeper.

All material received is posted from the Register of Material Received to these cards, showing the quantity, total cost and consignor. This work is done from day to day by the Storekeeper, following closely upon the posting of the invoices to the Register.

The Storekeeper when entering the values on the "Orders on Storekeeper," also posts to the cards the quantity, value and account chargeable for material used.

[illegible]

FIG. 220.—FORM 20.

[illegible]

FIG. 221.—FORM 21.

At the end of each month after all invoices for the month have been posted and the entries made on the cards for all material received, the balance of the stores used are posted and the cards are balanced, showing in the balance column the quantity and value as of the first of the month. Once a year the cards are checked against the actual count or weight of material on hand.

Stores Used Records.—Stores are delivered only on the presentation of an “order” properly signed by some one authorized to sign such orders. These orders are posted to the Stores cards and the values entered on the orders at the same time.

THE PORTLAND GOLD MINING CO. ORDER ON STOREKEEPER <div style="text-align: right; margin-top: 10px;">_____ 190 _____</div>		
Storekeeper will please deliver to bearer and charge to _____ _____ _____ _____ _____ _____ _____ <div style="text-align: right; margin-top: 10px;">_____ Foreman.</div>		

FIG. 222.—FORM 22.

Form M-25 10-28-10 2M					
THE PORTLAND GOLD MINING COMPANY (MINE DEPARTMENT) STORE ROOM DISTRIBUTION <div style="text-align: right; margin-top: 10px;">For _____ 191 _____</div>					
Quantity	Description	Cost	Total Cost	Charge Acc't No.	
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

FIG. 223.—FORM 25.

No.

THE PORTLAND GOLD MINING CO.

DAILY LABOR AND PRODUCTION REPORT

Victor, Colorado, 190.....

To Irving Howbert, President,
Colorado Springs:

LABOR			PRODUCTION					
Office Account	Office Men		HOIST	Shaft No. 1	Ore	Cars	Tons	
	Surveyors				Mill Dirt			
	New Building				Waste			
	New Machinery				Timber			
Construction	Cribbing			Totals				
	Foremen			Shaft No. 2	Ore			
	Shift Bosses				Mill Dirt			
	Machine Men				Waste			
	Machine Helpers				Timber			
	Hand Miners			Totals				
	Muckers			Shaft No. 3	Ore			
	Trammers				Mill Dirt			
	Timbermen				Waste			
	Timber Helpers				Timber			
Operating Stopes	Ore Sorters and Loaders			Totals				
	Trammers—Ore House		Totals	Ore and Waste				
	Nippers			Per Man				
	Track and Pipe Men			Total Tons to Date				
	Cagers and Topmen							
	Samplers		ORE HOUSES	Shaft No. 1	Ore			
	Scavenger				Waste			
					Net Ore			
Development	Machine Men			Shaft No. 2	Ore			
	Machine Helpers				Waste			
	Hand Miners				Net Ore			
	Trammers		Shaft No. 3	Ore				
Timbermen		Waste						
Timber Helpers		Net Ore						
			ORE DISBURSEMENT					
	Machine Shop			Tons Loaded	Tons Shipped	Lot Nos.	Assays	
	Hoisting } Surface							
	Engineers } Underground							
	Compressor Engineers							
	Boiler Room		Shaft No. 1					
	Pumpmen							
Shops and Surface Labor	Blacksmith Shop		Shaft No. 2					
	Carpenter Shop							
	Surface Men							
	Watchmen							
	Powdermen		Shaft No. 3					
	Storekeeper							
	Haulage Engineers							
TOTALS			TOTALS					
TOTAL SHIFTS TO DATE			Total Tons to Date					

Remarks:

FIG. 224.—FORM 27.

A summary of the stores used each day is entered on a Daily Store Room Distribution, Fig. 223, form No. 25. In making up this report the charges against the various accounts are grouped and the charges against each account is subdivided to show the various kinds of material used, also the quantity and value. This report is made out by the Store-keeper and turned into the mine office.

The daily report or Store Room Distribution is posted to a Record of Stores Used, Fig. 211, form No. 8 (same as labor distribution), which is the permanent record of material used for the month. On this record the charges are shown under the various accounts benefited.

Physical Report.—A Daily Labor and Production Report, Fig. 224, form No. 27, is made out by the mine clerk each morning and forwarded to the President of the company. This report shows a distribution of the labor for the day, an analysis of the material hoisted, also a distribution of the shipments.

Physical Report. Monthly.—This report is made out each day from the Daily Physical Report. The report is cumulative, giving an accurate statement of the Labor, Production and Shipments.

This report is kept in the Manager's office for ready reference.

Watchman's Report.—The Watchman makes out during his shift a

Form M-15-1M-3-30-11

THE PORTLAND GOLD MINING CO.

WATCHMAN'S REPORT

Date _____ 191_____
Shift _____

BOX NO.	1	2	3	4	5	6	7	8	9
P.M. 1									
2									
12									

A.M. 1	2	11	12

Remarks: _____

Watchman

FIG. 226.—FORM 15.

report, Fig. 226, form No. 15, showing the time that he passed the different boxes on his rounds. This report goes to the Superintendent.

Ore Register.—An ore register is kept at the mine office, showing on the left-hand page the lot number of each shipment, the numbers of the cars in which it was shipped, the gross, tare and net weight of each car. On the right-hand page is shown the mill settlements; the deductions for moisture, the mine and mill control assays and umpire assay, if any; the settlement assay, gross value of the lot, deductions for freight and treatment charges, and net returns to the mine.

Shipping Report.—For each lot of ore shipped there is a Shipping Report made out like the following:

SHIPPED FROM <u>PORTLAND MINE</u> TO _____																
										Date _____						
Mine Lot No. _____										Kind of Ore _____						
INT CAR	CAR NO.	GROSS					TARE					NET				
TOTAL WEIGHTS																

FIG. 227.—FORM 30.

Stope and (or) Development Sheets.—At the end of each month two reports are made out, one to cover the months operations in all the active stopes of the mine and the other to cover the month's operations in all the active Development openings of the mine. These reports show the active openings listed. The information called for by the headings on the sheets is taken from the Distribution Sheets, form No. 6. The heading on the Stope sheet marked General Expense covers, Pumping Lighting, Assaying Surveying, Repairs, General Expense and Office Expense. The total cost on the Stope sheet equals the Stopping account in the ledger. The total cost on the Development sheet equals the Development account in the ledger. These reports go to the Manager.

General Cost Sheet.—The Cost Sheet, Fig. 229, form No. 40, is made up as soon after the end of the month as possible. This Cost Sheet, which shows all the mine expense accounts, is kept on the co-ordinate

THE PORTLAND GOLD MINING CO.

ONE SHIPPED, ONE STOPPED, ONE MILED, ONE TONN, FINE GOLD, DEVELOPMENT, FEET, MONTH OF, GENERAL COST SHEET, 1918

PLANT ACCOUNT	MILLING		RELEVANT		STOPS		Tonnage
	1	2	3	4	5	6	
Operating Accounts	1	2	3	4	5	6	7
Development, Milling and Plant	1	2	3	4	5	6	7
Distributed Accounts	1	2	3	4	5	6	7
Plant Account	1	2	3	4	5	6	7
Operating Accounts	1	2	3	4	5	6	7
Development, Milling and Plant	1	2	3	4	5	6	7
Distributed Accounts	1	2	3	4	5	6	7
Plant Account	1	2	3	4	5	6	7
Operating Accounts	1	2	3	4	5	6	7
Development, Milling and Plant	1	2	3	4	5	6	7
Distributed Accounts	1	2	3	4	5	6	7
Plant Account	1	2	3	4	5	6	7
Operating Accounts	1	2	3	4	5	6	7
Development, Milling and Plant	1	2	3	4	5	6	7
Distributed Accounts	1	2	3	4	5	6	7
Plant Account	1	2	3	4	5	6	7
Operating Accounts	1	2	3	4	5	6	7
Development, Milling and Plant	1	2	3	4	5	6	7
Distributed Accounts	1	2	3	4	5	6	7
Plant Account	1	2	3	4	5	6	7
Operating Accounts	1	2	3	4	5	6	7
Development, Milling and Plant	1	2	3	4	5	6	7
Distributed Accounts	1	2	3	4	5	6	7
Plant Account	1	2	3	4	5	6	7
Operating Accounts	1	2	3	4	5	6	7
Development, Milling and Plant	1	2	3	4	5	6	7
Distributed Accounts	1	2	3	4	5	6	7
Plant Account	1	2	3	4	5	6	7
Operating Accounts	1	2	3	4	5	6	7
Development, Milling and Plant	1	2	3	4	5	6	7
Distributed Accounts	1	2	3	4	5	6	7
Plant Account	1	2	3	4	5	6	7
Operating Accounts	1	2	3	4	5	6	7
Development, Milling and Plant	1	2	3	4	5	6	7
Distributed Accounts	1	2	3	4	5	6	7
Plant Account	1	2	3	4	5	6	7
Operating Accounts	1	2	3	4	5	6	7
Development, Milling and Plant	1	2	3	4	5	6	7
Distributed Accounts	1	2	3	4	5	6	7
Plant Account	1	2	3	4	5	6	7
Operating Accounts	1	2	3	4	5	6	7
Development, Milling and Plant	1	2	3	4	5	6	7
Distributed Accounts	1	2	3	4	5	6	7
Plant Account	1	2	3	4	5	6	7
Operating Accounts	1	2	3	4	5	6	7
Development, Milling and Plant	1	2	3	4	5	6	7
Distributed Accounts	1	2	3	4	5	6	7
Plant Account	1	2	3	4	5	6	7
Operating Accounts	1	2	3	4	5	6	7
Development, Milling and Plant	1	2	3	4	5	6	7
Distributed Accounts	1	2	3	4	5	6	7
Plant Account	1	2	3	4	5	6	7
Operating Accounts	1	2	3	4	5	6	7
Development, Milling and Plant	1	2	3	4	5	6	7
Distributed Accounts	1	2	3	4	5	6	7
Plant Account	1	2	3	4	5	6	7
Operating Accounts	1	2	3	4	5	6	7
Development, Milling and Plant	1	2	3	4	5	6	7
Distributed Accounts	1	2	3	4	5	6	7
Plant Account	1	2	3	4	5	6	7
Operating Accounts	1	2	3	4	5	6	7
Development, Milling and Plant	1	2	3	4	5	6	7
Distributed Accounts	1	2	3	4	5	6	7
Plant Account	1	2	3	4	5	6	7
Operating Accounts	1	2	3	4	5	6	7
Development, Milling and Plant	1	2	3	4	5	6	7
Distributed Accounts	1	2	3	4	5	6	7
Plant Account	1	2	3	4	5	6	7
Operating Accounts	1	2	3	4	5	6	7
Development, Milling and Plant	1	2	3	4	5	6	7
Distributed Accounts	1	2	3	4	5	6	7
Plant Account	1	2	3	4	5	6	7
Operating Accounts	1	2	3	4	5	6	7
Development, Milling and Plant	1	2	3	4	5	6	7
Distributed Accounts	1	2	3	4	5	6	7
Plant Account	1	2	3	4	5	6	7
Operating Accounts	1	2	3	4	5	6	7
Development, Milling and Plant	1	2	3	4	5	6	7
Distributed Accounts	1	2	3	4	5	6	7
Plant Account	1	2	3	4	5	6	7
Operating Accounts	1	2	3	4	5	6	7
Development, Milling and Plant	1	2	3	4	5	6	7
Distributed Accounts	1	2	3	4	5	6	7
Plant Account	1	2	3	4	5	6	7
Operating Accounts	1	2	3	4	5	6	7
Development, Milling and Plant	1	2	3	4	5	6	7
Distributed Accounts	1	2	3	4	5	6	7
Plant Account	1	2	3	4	5	6	7
Operating Accounts	1	2	3	4	5	6	7
Development, Milling and Plant	1	2	3	4	5	6	7
Distributed Accounts	1	2	3	4	5	6	7
Plant Account	1	2	3	4	5	6	7
Operating Accounts	1	2	3	4	5	6	7
Development, Milling and Plant	1	2	3	4	5	6	7
Distributed Accounts	1	2	3	4	5	6	7
Plant Account	1	2	3	4	5	6	7
Operating Accounts	1	2	3	4	5	6	7
Development, Milling and Plant	1	2	3	4	5	6	7
Distributed Accounts	1	2	3	4	5	6	7
Plant Account	1	2	3	4	5	6	7
Operating Accounts	1	2	3	4	5	6	7
Development, Milling and Plant	1	2	3	4	5	6	7
Distributed Accounts	1	2	3	4	5	6	7
Plant Account	1	2	3	4	5	6	7
Operating Accounts	1	2	3	4	5	6	7
Development, Milling and Plant	1	2	3	4	5	6	7
Distributed Accounts	1	2	3	4	5	6	7
Plant Account	1	2	3	4	5	6	7
Operating Accounts	1	2	3	4	5	6	7
Development, Milling and Plant	1	2	3	4	5	6	7
Distributed Accounts	1	2	3	4	5	6	7
Plant Account	1	2	3	4	5	6	7
Operating Accounts	1	2	3	4	5	6	7
Development, Milling and Plant	1	2	3	4	5	6	7
Distributed Accounts	1	2	3	4	5	6	7
Plant Account	1	2	3	4	5	6	7
Operating Accounts	1	2	3	4	5	6	7
Development, Milling and Plant	1	2	3	4	5	6	7
Distributed Accounts	1	2	3	4	5	6	7
Plant Account	1	2	3	4	5	6	7
Operating Accounts	1	2	3	4	5	6	7
Development, Milling and Plant	1	2	3	4	5	6	7
Distributed Accounts	1	2	3	4	5	6	7
Plant Account	1	2	3	4	5	6	7
Operating Accounts	1	2	3	4	5	6	7
Development, Milling and Plant	1	2	3	4	5	6	7
Distributed Accounts	1	2	3	4	5	6	7
Plant Account	1	2	3	4	5	6	7
Operating Accounts	1	2	3	4	5	6	7
Development, Milling and Plant	1	2	3	4	5	6	7
Distributed Accounts	1	2	3	4	5	6	7
Plant Account	1	2	3	4	5	6	7
Operating Accounts	1	2	3	4	5	6	7
Development, Milling and Plant	1	2	3	4	5	6	7
Distributed Accounts	1	2	3	4	5	6	7
Plant Account	1	2	3	4	5	6	7
Operating Accounts	1	2	3	4	5	6	7
Development, Milling and Plant	1	2	3	4	5	6	7
Distributed Accounts	1	2	3	4	5	6	7
Plant Account	1	2	3	4	5	6	7
Operating Accounts	1	2	3	4	5	6	7
Development, Milling and Plant	1	2	3	4	5	6	7
Distributed Accounts	1	2	3	4	5	6	7
Plant Account	1	2	3	4	5	6	7
Operating Accounts	1	2	3	4	5	6	7
Development, Milling and Plant	1	2	3	4	5	6	7
Distributed Accounts	1	2	3	4	5	6	7
Plant Account	1	2	3	4	5	6	7
Operating Accounts	1	2	3	4	5	6	7
Development, Milling and Plant	1	2	3	4	5	6	7
Distributed Accounts	1	2	3	4	5	6	7
Plant Account	1	2	3	4	5	6	7
Operating Accounts	1	2	3	4	5	6	7
Development, Milling and Plant	1	2	3	4	5	6	7
Distributed Accounts	1	2	3	4	5	6	7
Plant Account	1	2	3	4	5	6	7
Operating Accounts	1	2	3	4	5	6	7
Development, Milling and Plant	1	2	3	4	5	6	7
Distributed Accounts	1	2	3	4	5	6	7
Plant Account	1	2	3	4	5	6	7
Operating Accounts	1	2	3	4	5	6	7
Development, Milling and Plant	1	2	3	4	5	6	7
Distributed Accounts	1	2	3	4	5	6	7
Plant Account	1	2	3	4	5	6	7
Operating Accounts	1	2	3	4	5	6	7
Development, Milling and Plant	1	2	3	4	5	6	7
Distributed Accounts	1	2	3	4	5	6	7
Plant Account	1	2	3	4	5	6	7
Operating Accounts	1	2	3	4	5	6	7
Development, Milling and Plant	1	2	3	4	5	6	7
Distributed Accounts	1	2	3	4	5	6	7
Plant Account	1	2	3	4	5	6	7
Operating Accounts	1	2	3	4	5	6	7
Development, Milling and Plant	1	2	3	4	5	6	7
Distributed Accounts	1	2	3	4	5	6	7
Plant Account	1	2	3	4	5	6	7
Operating Accounts	1	2	3	4	5	6	7
Development, Milling and Plant	1	2	3	4	5	6	7
Distributed Accounts	1	2	3	4	5	6	7
Plant Account	1	2	3	4	5	6	7
Operating Accounts	1	2	3	4	5	6	7
Development, Milling and Plant	1	2	3	4	5	6	7
Distributed Accounts	1	2	3	4	5	6	7
Plant Account	1	2	3	4	5	6	7
Operating Accounts	1	2	3	4	5	6	7
Development, Milling and Plant	1	2	3	4	5	6	7
Distributed Accounts	1	2	3	4	5	6	7
Plant Account	1	2	3	4	5	6	7
Operating Accounts	1	2	3	4	5	6	7
Development, Milling and Plant	1	2	3	4	5	6	7
Distributed Accounts	1	2	3	4	5	6	7
Plant Account	1	2	3	4	5	6	7
Operating Accounts	1	2	3	4	5	6	7
Development, Milling and Plant	1	2	3	4	5	6	7
Distributed Accounts	1	2	3	4	5	6	7
Plant Account	1	2	3	4	5	6	7
Operating Accounts	1	2	3	4	5	6	7
Development, Milling and Plant	1	2	3	4	5	6	7
Distributed Accounts	1	2	3	4	5	6	7
Plant Account	1	2	3	4	5	6	7
Operating Accounts	1	2	3	4	5	6	7
Development, Milling and Plant	1	2	3	4	5	6	7
Distributed Accounts	1	2	3	4	5	6	7
Plant Account	1	2	3	4	5	6	7
Operating Accounts	1	2	3	4	5	6	7
Development, Milling and Plant	1	2	3	4	5	6	7
Distributed Accounts	1	2	3	4	5	6	7
Plant Account	1	2	3	4	5	6	7
Operating Accounts	1	2	3	4	5	6	7
Development, Milling and Plant	1	2	3	4	5	6	7
Distributed Accounts	1	2	3	4	5	6	7
Plant Account	1	2	3	4	5	6	7
Operating Accounts	1	2	3	4	5	6	7
Development, Milling and Plant	1	2	3	4	5	6	7
Distributed Accounts	1	2	3	4	5	6	7
Plant Account	1	2	3	4	5	6	7
Operating Accounts	1	2	3	4	5	6	7
Development, Milling and Plant	1	2	3	4	5	6	7
Distributed Accounts	1	2	3	4	5	6	7
Plant Account	1	2	3	4	5	6	7
Operating Accounts	1	2	3	4	5	6	7
Development, Milling and Plant	1	2	3	4	5	6	7
Distributed Accounts	1	2	3	4	5	6	7
Plant Account	1	2	3	4	5	6	7
Operating Accounts	1	2	3	4	5	6	7
Development, Milling and Plant	1	2	3	4	5	6</	

FIG. 229.—FORM 40.

system, the debits being shown on the horizontal lines, and the credits in the vertical columns. Thus each item on the Cost Sheet is viewed in two relations, a credit to the heading under which it is, and a debit to the heading opposite on the horizontal line.

The direct charge of labor against the various accounts is shown in the Pay-roll column. In the General Office column is shown a summary of the Voucher Register for the month. Other Expense, which is a sub-account of Stoping covers the following items; Pumping, Lighting, Assaying, Surveying, Repairs, General Expense, and Office Expense.

ENGINEERING DATA

The essential feature of the system is that all work is done under a serial system of numbering of cross-cuts, raises, winzes, stopes, and any class of opening that may occur underground. That is in any given mine we begin with No. 1 for each class of work on each level and

FIG. 230.

Having a description of the way the office records are kept and illustrative forms, it will be an easy matter to understand the necessary form of note book used for various classes of field work.

FIG. 231.

317

The Survey card is shown as Fig. 230, the reverse side of this card is shown as Fig. 231. The markers used with these cards are merely blank cards carrying the word Survey on the segment of a circle raised above the cards so it can be seen as shown in Fig. 232.

The diagram shows a survey card template with the following sections and labels:

- LEVEL TOTALS**: A section at the top with a tab labeled **10**.
- RAISES**: A section below Level Totals.
- STOSES**: A section below Raises.
- MEASUREMENT**: A section below Stoses.
- ELEVATIONS**: A section below Measurement.
- SKETCH**: A section below Elevations.
- SURVEY**: A section below Sketch, with a tab labeled **1**.

FIG. 232.

Referring to Fig. 230 the card headings give a full description of location as well as reference. The description includes Mine, Level, Initial Point, which is station No. 7 in this particular case, the total latitude and departure of which follow, and "Survey of" the number

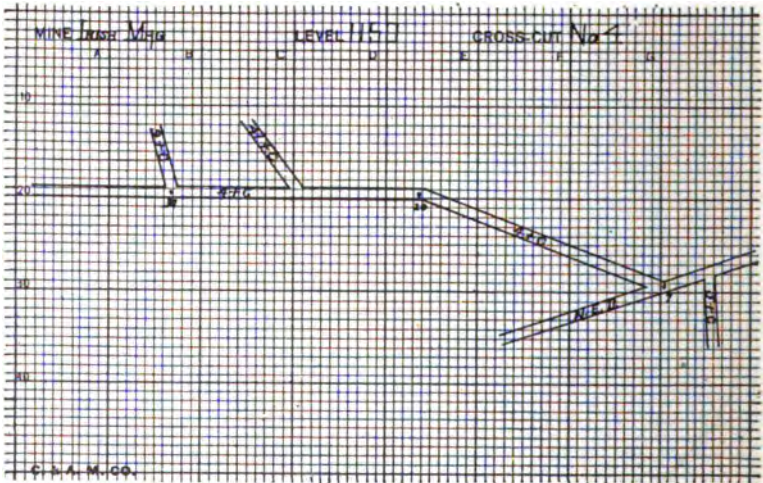


FIG. 233.

of any desired cross-cut. In this case it is No. 4 cross-cut. The reference are "Note Book" and page giving the place where the original field work was done. The column headings are self-explanatory, however.

Figure 234, is of an Elevation card. The card headings are self-explanatory, except heading "Sketch B. M." which is really station No. 7, but for convenience the rail under station No. 7 is used (refer to Fig. 233). At any time the rail can be checked up from the B. M. Station No. 7. Accordingly in the column heading "Station" we put No. 7 or whichever is the last point referred to. To save space this card is the same on both sides so that a long series of levels can be kept on the same card.

[illegible]

FIG. 234.

Digitized by Google

Figure 236 is a "Raise and Winze" card combined. The card headings give the location, as on the other cards, the latitude and departure in this case, however, locate the center of the raise, and lengthwise it is parallel to the course of No. 2 cross-cut at this point. On the left side of the card is given a sketch of the symbols used for a raise and a winze, also a verticle section of either. Usually this vertical section is filled in solid as the raising or sinking advances, or a mark is put at the point where the work was discontinued. In the illustration it is not marked. This vertical section also shows our standard distance between levels which is 103 ft. This is made up of one sill or Zero set of 9 ft. and 12 other sets, as marked, each 7 ft. 10 in. The columns are self explanatory. The back of this card is blank.

MINE Iron Mt. STOPE No. 4 FLOOR No. 6 LEVEL 1150
 STOPE BOOK 7 PAGE 9 LOCATION 2 Cross Cut LAT 8244 DEP. 8252 No. 4

SETS STORED DURING MONTH END.	JAN.	FEB.	MAR.	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL	INDIC.	COLOR
						2									RED
						6									GREEN
															BROWN
															BLUE
															YELLOW
						15									BLACK
						24									RED
								4							GREEN
									17						BROWN
										5					BLUE
															YELLOW
															BLACK

REMARKS

S. & A. M. CO.

FIG. 237.

The next card of the series, shown as figure 237, is of Floor No. 6, Stope No. 4. Headings are given on this card stating the raise off of which the stope is made and the cross-cut on which the raise is located. The latitude and departure is off the center of the raise No. 4. The number of the stope is always the same as the number of the raise from which it is worked. If there is a raise which has no stope off of it, a card is put in the proper place under stopes, showing that there is no stopping under that number, in this way all confusion is avoided. The left hand half of the card is cross-sectioned for sketching, also lettered and numbered for the convenience of the stopeman.

Detail of the sketch is shown full size in Fig. 237, a. The right half

of the card gives space for recording the number of sets taken out each month during the years 1902 to 1910. It also shows the colors used for each month and the cross-hatching for each six months. Thus by reference to any stope, we can tell the number of sets stoped in any month of any year and their exact location. There are as many cards to each stope as there are floors. The back of this card is blank.

Figure 238 is our Measurement card. It is unnecessary to fill in any of the headings or columns on this form for illustration, as they are so arranged as to be used for all measurement totals. For example take the card heading "Monthly record of All," this can be followed by "Raises and Winzes," or Sub-Raises and Sub-Winzes or Cross-cuts, or Sub-cross-cuts or Openings, written in the blank space. After "On," the blank may be filled by any particular level number as 1150 or by "All," meaning all levels in that mine. This card is also applicable for one month in any year, or follow the word month with "All" and it becomes a total card for the whole year. Under the first column head-

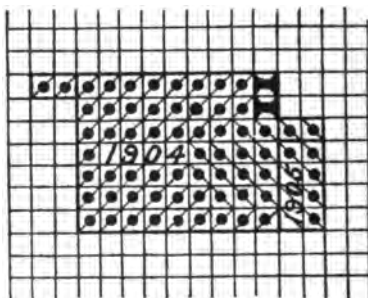


FIG. 237a.

ing "Name of" put whatever the card is being used for in half space, such as "Cross-cut" or "Winze," then below this on the lines, will follow the numbers of the particular openings designated. The entries under any month are totaled at the foot of the card, the total is carried to the reverse side of the card, and from there it can be carried to another card and so on indefinitely. At the end of the year (say 1912) the entries of openings are cross totaled and entered in the column headed "Feet Extended." The sum of the twelve column totals under months will check and equal the total of the column headed "Feet Extended." In the next column headed "Total Length" December 31, 1911, we have the total length of the opening copied over from the previous year. This figure plus the feet extended equals the total length December 31, 1912. As a final check on the figures, the sum of the totals of columns "Feet Extended" and "Total Length" December 31,

The "Stopes Total card" shown as Fig. 239, is very elastic in its use similar to the Measurement total card. It can be used for the stope totals of one level in a mine, or all levels, or for one or all months, as the case may demand. The column headings are self-explanatory after the descriptions of the total cards for measurements.

The object of these total cards is so that at any time we can get the work (either stoping or development work) done up to the given time. This is very easily accomplished with this form of card and it can be done by any engineer, whether he posted the work or not. The back

[illegible]

FIG. 238.

The arrangement of the cards in the boxes is merely a matter of detail. We use groups of ten subjects for each marker, that is, in front of the marker "Survey" there would be the survey of ten cross-cuts serially. The main numerical markers No. 1 and No. 10, Fig. 232, are of yellow cardboard, General markers, such as are used to designate "Level Totals," Fig. 232, are a reddish cardboard. There are other special markers, but it is not necessary to describe them here. In general the records of the mine are kept in one or more drawers marked to that effect on the front. If there are records of more than one mine in a drawer, the records of each are kept separate by sub-markers.

It can be seen from the foregoing what all the forms used for keeping notes of the field work are. Fig. 231 is on the reverse side of the Survey card (Fig. 230), and it has the same columns and headings as the pages of the survey field book. This gives us an exact reproduction of our field notes, so if a field book is lost we have all the notes as taken. For elevation and measurement, the form used in the field is identical with

tions equivalent to the heights of sets and plotted on the map in irregular outline.

This outlines the system of keeping engineering records of the underground work.

ENGINEERING DATA

METHODS OF RECORDING USED BY THE BOSTON AND MONTANA CONSOLIDATED COPPER AND SILVER MINING COMPANY

With a large company like the Boston and Montana, it is of the utmost importance that the engineering records should be kept in such shape that any information desired in the process of development and mining can be obtained with the least possible delay. The fact that all of the notes and records taken in the field are correct and self-explanatory does not insure that they can, without additional and special helps, be used to the best advantage in the office.

The system used by this company was not adopted at any one time, but was the outgrowth of needs made manifest during ten years past. One addition has demanded another, while old methods have been discarded for new and better ones.

The field work of the present systems consists of surveying, stope and progressing measuring. For each branch of work a special book is used, all books being made to order. The surveying books, which are $5\frac{1}{2} \times 8\frac{1}{2}$ in. in size, have the following printed headings above each double page, "Transit" "H. I." "Ang. R." "Courses, Mag. and True" "Vert. Ang. and Slope Dist." "H. P." "Station to Floor" "Horz. Dist." "Description."

Each heading is in a separate column. In the Transit column are the numbers of the stations at which the transit is set up and numbers of the backsight stations, written like this, "11517 B. S. 8623." "H. I." means height of instrument from the brass tag at the point of observation. In underground stations, written like this, "11517 B. S. 8623." "H. I." means height of instrument from the brass tag at the point of observation. In underground work these tags are usually placed above the opening, upon a car or plug in the roof. In such cases the H. I. would be "to the axis of the telescope." All angles are turned to the right of the backsight and then doubled, both readings being recorded in the column "Ang. R." the first being above the second.

316 degrees 08'

The angles taken at No. 11517 above are recorded 272 degrees 16' Magnetic courses are taken at every set-up and recorded in the column "Courses Mag. and True." The true courses are also recorded in ink in this column after calculation in the office. While magnetic bearings

are not accurate enough for close work, yet if an error of two or more degrees is made at any given point, the several readings of the needle at succeeding points in the survey will indicate about where the error was made. It is for this reason that magnetic bearings are taken.

The heading of the next column is self-explanatory. "H. P." is the vertical distance from the line of sight to the brass tag at the forward station. From this tag the distance is measured to the floor and recorded in the column "Station to Floor." For surveying purposes, the elevations of the brass tags are calculated, while for the use of the manager, superintendent and mine foreman, the elevations of the Floors are determined.

"Horizontal Distance" contains either actual horizontal distance measured or reductions from slope distances.

The last space, "Description" is cross-sectioned sixteen squares to the square inch. It occupies about three-fourths of one single page and is used for the description of the survey stations, side points, and for sketches of mine openings, etc.

The surveys are made and recorded in such a manner that all openings with the square sets therein, also all surface improvements and natural objects, contours, etc., can be accurately platted. The notes of all surveys are recorded in chronological order from the beginning to the end of each book. This brings all survey stations numbers in order through the books, but in continuing the work from month to month, any place surveyed more than once will appear only in its regular monthly order. An index of all such places is kept in the front of each book.

The field notes having been taken and recorded in the manner described, are now reduced in the office. The surveyor and his assistant have calculation books paged alike, and upon pages numbered the same, make like reductions, both working together and making comparison as the work progresses. The observed angles are reduced to azimuths, and the bearings determined therefrom by inspection. Horizontal and slope distances are calculated from the vertical angles and slope distances. The coordinates and elevations of all the survey stations are calculated. The zero point of the coordinate system was established in such a manner that almost all the stations located are north and east of that point. The elevations are given in feet above sea level. In these calculations "Gurden Traverse Tables" and "Vega Logarithmic Tables" are used.

As soon as the calculations are made, the number of the page in the calculation book where the work is done, is marked in ink in the field book, so that every figure used in the calculations can be found at any time by reference to the field book, and then to the page in the calculation book.

In order to preserve the notes in case of loss or damage of a field book, complete office records of all the essential features of the field notes are kept. These records are in ledgers 11 in. \times 14 in. In addition to the headings given in the field books the ledgers have the following; "Azimuth," "Vertical Distance," "Latitude N. S.," "Departure E. W.," "Ordinate N. S. E. W." "Elevation," "Floor Elevation," "Page in the Field book." In these columns are recorded the office deductions. The sketches made in the field books as are not copied in the ledgers, but are platted with the regular monthly surveys, and thus preserved. The ledgers have an index of all places surveyed, exactly like the index in the field books.

All station numbers are indexed in books made for that purpose, the headings for which are "Station," "Page in ledger," "Page in field book," "mine." No duplicate survey numbers are used in any of the company work. All corners of mining claims owned by the company have been located and indexed. The index book contains the name of the claim, the lot and survey number, the location and description of each corner with the markings thereon the coordinated, page in the ledger where the survey is recorded, bearings and distances from corner to corner as determined by calculations from the coordinates, and page in the calculation books where the calculations were made. All of this data is recorded in columns which have printed headings descriptive thereof.

For a better preservation of all underground work, several years ago, a complete set of office stoop books were made. These books are 18 in. \times 24 in. The pages are ruled with coordinate lines in the process of manufacturing as it was found that the ruling could be done by the printing office much more accurately than by hand, and at far less cost. Each double page contains 176 squares, 2 in. each way, or, with the scale used in platting, 50 ft. to the inch, each double page covers a territory of 800 ft. by 2200 ft. There are at the present time six sets of these books covering all the principal mining operations of the company, and if placed together in proper relation, would include ground described as follows: north 3200 ft., east 2200 ft., north 800 ft. east 2200 ft., South 1600 ft., west 2200 ft., south 2400 ft., and west 2200 ft. Each of these books contains 130 double pages, numbered alike. The first book in each set includes workings from the surface to and including the ninth level, the second book includes from the floor of the ninth, to and including the eighteenth level. The third book will include not over five levels. It has been found that nine levels are too many for one book.

The books are constantly in use, and the wear on them is too great for more than five levels. Underground workings of the company,

outside of those included in the books, are platted upon sheets of mounted drawing paper 18 in. \times 24 in., being the same size as one page of a stope book. These sheets are adjusted to the pages of the stope books, so as to form a continuation of the system used in the books. The coordinate numbers are hand printed at the top and side of each double page of all the books, and also on the mounted sheets. The books include the levels, with all the stope floors above the levels, so that when platted they contain a representation of all openings, with the square sets, at every interval of about 7.5 ft. in elevation throughout the mines, all being properly adjusted to the coordinates, and hence to each other.

The platting of the surveys is in order after the office work in connection with the field notes has been completed. This is done by scaling from the nearest coordinate lines north and east to the points for these survey stations, using the coordinates of the stations for the distances.

The platting is checked by scaling the distances from succeeding points. The square sets are then platted in proper relation to the survey, and the boundaries of the openings drawn as given from the special notes or sketches in the field books. Every square set is represented as it exists in the mine. This comprises the platting of the surveys in the books.

In order to preserve the books from unnecessary wear, the workings of each level in each mine are transferred to mounted sheets 28 in. \times 48 in., this size being sufficiently large to include all the workings of any mine. The station numbers are platted on these sheets from the calculated coordinates. From the mounted maps all tracings of levels and reductions to other scales are made.

For various uses, all levels are reduced by pantograph from the 50 ft. scale to 100 ft. scale, and from that to 200 ft. scale. All the reduced maps are upon mounted sheets of drawing paper, 18 in. \times 24 in., and are so related to the coordinate system that additional sheets can be added in any direction.

None of the maps described in this article are composite, each sheet representing one level only. Each level, except in the stope books, has a special color for that particular elevation. Water colors are used on mounted paper, and "no rinkle" or colored pencils on tracings. Colored pencils used on the dull side with india ink lines on the glazed side make the best maps. The colors are toned down with felt or chamois stumps. All the workings in the office stope books, including stopes, have a color for each year, the work being brought up at the beginning of the calendar year. All mine numbers are hand printed on all level maps, as well as in the stope books.

The surface survey is platted 50 ft. to the inch, upon mounted sheets covering all the property owned by the company. They are arranged

in numerical order, and show all streams, roads, ditches, shafts, tunnels, open cuts, buildings, railroads, and all claim lines, with shading around the boundary of the company property.

For general use, all the features on these sheets have been reduced to 100 ft. scales, upon mounted sheets of the same size as the 50 ft. scale maps. All of the surface sheets will be corrected from time to time as changes are made, and new sheets substituted for old ones. There is an index sheet for the surface maps of the same size. It shows all claims owned by the company drawn to scale of 800 ft. to the inch, and is cross-sectioned so as to represent the spaces occupied by the different surface sheets. Numbers from 1 to 240 are placed in the rectangular spaces, and the corresponding numbers, as used are printed upon the bottom of the surface sheets. Knowing the locality desired for examination, the index gives the sheet sought. By using one, four, or sixteen squares on the index sheets it is an index for 50 ft., 100 ft., and 200 ft. scale maps.

The stopes are measured or "taken up" as it is called, once a month, or oftener if it becomes necessary. For this work leather bound books $5\frac{3}{8}$ in. \times $11\frac{1}{2}$ in. in size are used. The pages are cross-sectioned, giving 16, 36, 64, or 100 squares to the inch. The boundaries of the square inches are heavier than all the other lines. The small veins are sketched in the books having the large squares, and the large veins in those having the small squares. Usually before going underground, the portion of the level where the stopes are to be located is sketched from the office stope books into the field book, the location of all chutes and survey stations being indicated, as in office books. In the field books, however, the drifts are made to follow the cross-section lines by indicating the bends by \vee or \wedge , as the drift bends either to right or left. The difference between the surveyed drift and the same drift sketched, will appear from Fig. 240.

The veins owned by the company run in an easterly and westerly direction, with usually a south dip. There are a few veins that dip to the north. The books represent the veins as viewed from the south.

In stoping up from a level on a south dipping vein the different floors will show offsets to the north. It is customary to give the number 10 to the first row of sets along the level on such a vein, using 11, 12, etc., for the offsets, either on the level or in the stopes. These numbers are carried in the chute sets, which are the reference sets for all of the floors of the stopes. On the level, the discharges of the chutes are sketched on the north side of the drift as they appear in the mine. On the first floor of the stope the chutes will then fall in 11, 12, etc. The posts standing on the level and in the stopes are represented by dots at the intersections of the printed lines in the books, while the chutes in the stopes are represented by squares which have their angles at the posts of

the chute sets. The stopes are sketched by counting the sets, indicating the posts and chutes as described, and by drawing the outlines around the openings. All bends or angles found in the stopes are located and sketched. Often measurements of irregular caps and girts are made, and sometimes it becomes necessary to carry a transit line into the stope. Within the sketches of the openings are recorded the dates upon which the stopes were "taken up." Usually but one floor is sketched on a page. When the veins dip north the row of sets on the level is numbered 10, and

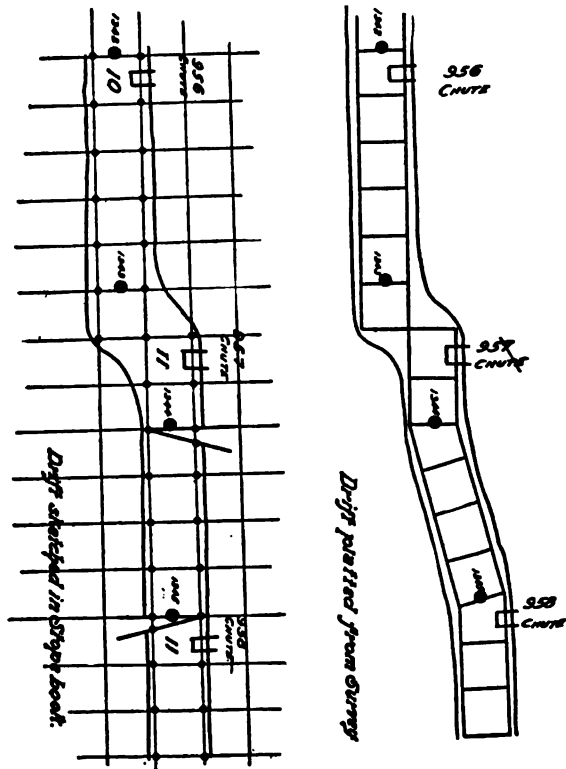


FIG. 240.

chutes show on the south side of the drift, the offsets in the stopes are numbered 9, 8, etc. After having been plated in the office, all notes in the field books are inked with indelible ink. The platting of the stopes in their proper position, relative to the coordinates in the office stope books, consists of carrying the lines of the square sets plated on the levels, up through the books by scaling, and testing with tracing paper, and then reproducing the sketches in the field books along those lines.

As a rule, all bends in the stopes conform to the bends on the levels, if not, they are platted as actually located in taking up the stopes. In the office books the chutes on all stope floors are colored black, and the numbers of the chutes are written adjoining. The lowest levels in all stope books are at the back of the books, and first floors of the levels next, and so on toward the front of the book for every level and stope above.

From what has been stated in regard to the construction of the office stope books, it can be readily understood that in case of a sudden demand for tracings of any or all workings, but a few days would be required in which to comply with the demand. This actually occurred less than two years since. A fire broke out in one of the mines and in order

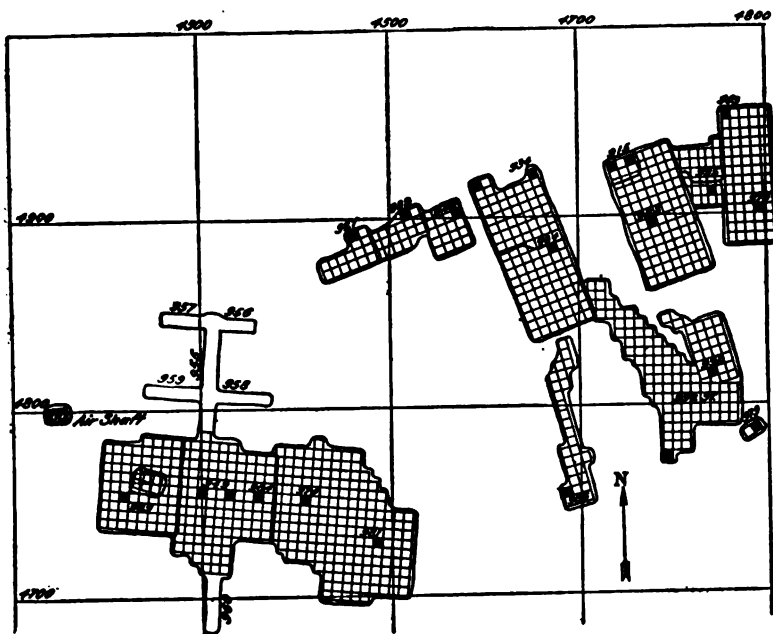


FIG. 241.

to stamp it out a large amount of extra mining was done. To do this and avoid breaking into old workings unexpectedly, it was necessary to make tracings, not only of several levels but of the stopes above the levels. With all the work correctly platted in the books, the tracings were ready for use within three days, whereas had the stopes not been platted as described, it would have required not less than a month and probably much longer. Then again, in the regular mining work it is often necessary to have special tracings, which will show any section of unworked ground, or the exact location of all stopes, or filling, cross-cuts, etc. The infor-

mation is always ready in the books for instant use, either by direct examination, or by tracings.

A clear idea of the entire stope-record system can be gained by an examination of the accompanying copy of a portion of a floor of one of the mines shown by Fig. 241.

In order to understand the progress measuring, a statement of the system of numbering used in the mines is necessary. All places such as cross-cuts, drifts, rises, winzes, chutes, and stopes are numbered in such a manner as at once to indicate the level on which they occur. For example all numbers on the first level are 100 to 199, A100 to A199, etc., all on the second level are 200 to 299, etc. So that all numbers for any level come within the hundred used in designating that level. On the 11th, and 21st, of each month all places run for development are measured, while upon the first of the month all openings including stopes are measured.

For the purpose of recording the progress of all shafts, cross-cuts, drifts raises, winzes, and stations, progress books are used which have these headings: Date, Vein, Place, Charge, Advance, Total, From, Height or Length, Width, Cubic Feet Ore, Cubic Feet Waste, Cars Ore, Cars Waste. The total distance mined in any particular place is recorded when measured in the column Total. The preceding measurement of that place is then subtracted from the total, and the remainder is recorded in the Advance column. Under the head Vein is written the name or number of the vein upon which any working is located, under place, is the number of the working, while under Charge, are the initials of the words showing for what purpose the work is being done. *M* is for mining, *D* is for development, *F* is for filling, *S S* is for shaft sinking. An account of the cost of mining all numbered places is kept by the clerical department of the company, and it is for that department the above letters are used. The purpose for which the work is run is determined by the foreman or superintendent. Under From is written the number of the opening from which any opening is measured. The other headings explain themselves. The cars of ore and waste are obtained from car-tally boss at the mines.

The record made in the field having been completed by calculations in the office determining the advance and cubic feet excavated, a report on progress sheets, 12 in.×17 in., is made out. The sheets for the monthly reports contain all the headings of the field books except, "Height or Length," Width, Cubic Feet, Total, and in addition have columns marked "Distance in Ore," "Width in Ore," "per cent. Copper," "Oz. Silver," Distance in Waste, Square Sets, Remarks.

During the progress of work in the mines a mine sampler takes samples of all veins. These samples are taken horizontally across the

vein, at right angles to it, and at regular intervals of from 5 to 10 ft. long. After these samples have been assayed, copies of the assayers reports are filed in the engineer's office. From these reports, all except stope assays are copied in assay books during the month. At the end of the month the recorded assays of any particular place are averaged, so that the progress in ore and waste, the width of the ore and the assay values are determined. These data are recorded on the sheets showing the monthly progress in the columns for that purpose. After these sheets have been carefully checked in every particular, they are used by the clerical department in making estimates of the cost of mining. They are then copied into bound progress books the same size as the sheets, there being a progress book for each mine. These books are constantly used for reference. The annual report of progress is made from these books, and contains a summary of everything therein recorded except assay value. These reports are copied in the annual progress books.

In order to preserve the knowledge of the exact location of all mine numbers, of which there are several thousand, and also as a partial index of the progress reports, the numbers are indexed in a set of books for that purpose. These books are 9 in. \times 11 in., one being used for each mine. Above the ruled columns are the printed headings, Number, Description, When Commenced, Place of Beginning, Ordinate *N*, Ordinate *E*, Remarks. The ordinates are scaled from the office stope books, and with other data, afford an accurate method of finding any number. These index books are brought up to date with the regular monthly work, all new numbers given out at the mine being located and recorded.

Of the office work thus far described, the most important, making reductions from the survey notes, copying field notes and office calculations, platting stopes, and copying monthly reports, is done by one person and checked by another. By this means all material errors are eliminated.

At the beginning of each year complete calculations of the ore reserves are made. Some of these calculations are made by applying the mine assays directly to particular portions of the veins as shown in the stope books, while a much larger number are made from maps showing longitudinal projections of the veins. The maps are 18 in. \times 24 in. and show the workings drawn to scale of 100 ft. to the inch.

The first map of any vein shows all workings on the vein from the surface to the sill of the twelfth level, while the second map will include all workings from the sill of the twelfth level to that of the twenty-sixth, level. These maps are cross-sectioned with lines 1 in. apart. The vertical lines are marked with the same numbers as the north and south coordinate lines in the books (stope), which include the veins projected. The horizontal lines are elevation lines and represent even hundreds of

feet above sea level. The planes of projection, except one which is north and south, are due east and west. All mine openings are projected by scaling east or west (except for north or south plane for which the scaling is north and south), from the nearest coordinates in the stope books to the ends of such openings, and then platting the distances thus obtained, on the projection sheets. The sill is first platted in this manner, using the calculated elevations to determine the vertical position on the sheet. Above the sill and parallel to it, are drawn pencil lines to represent the height of the stope floors, and the openings are then platted as stated. All new openings upon the vein are platted at the beginning of the year. The workings shown upon the projections are shaded with the same colors as the corresponding years in the stope books.

The veins are divided into convenient blocks, usually extending from one level to another, the blocks being bounded laterally by dotted red lines. The tons of ore in each block are obtained by scaling the height and length of the block from the map, multiplying the product of these two by the north and south width of the vein, and dividing the result by the estimated number of cubic feet of ore to the ton. The north and south width of the vein is obtained by calculation, from the average width of the vein given in the assay reports, and the course of the vein within the block. If the average width of the vein is found to be 10 ft. and its course is N. 35 degrees W., the width north and south will be 10 ft. divided by sine 35 degrees equals 17.4 ft. The course of the vein in the block is obtained by protractor from the drifts in the stope books, the general course of the vein being used. The contents in copper and silver in the blocks are obtained from the average mine assays of the drifts and raises inclosing the blocks. The extractions made during the year from any particular block are deducted from the total in the block by scaling from the projection maps, and making therefrom the necessary calculations of tons of ore, pounds of copper, and Oz. of silver.

Besides the annual determinations of the ore reserves, an estimate is made of the excess mined in the veins above the amount formerly calculated also a comparison between the cubic feet extracted from each mine and the total number of tons shipped, in order to determine the number of cubic feet of ore per ton in the mine.

Monthly and yearly records are kept in the department of the ore shipped from each mine, the per cent. copper, and ounces of silver and gold per ton, also the resulting pounds of copper, and ounces of gold and silver. The assay values of the ore are obtained from the sample cars which are regularly shipped to the smelter at Great Falls. These records are kept in books made to order for the purpose.

The above descriptions include the salient features of the methods of keeping engineering records used by this company. There are a

number of details which have necessarily arisen in connection with the elaboration of the work, which need not be mentioned.

All permanent records are kept in the most concise form possible, and are especially adapted to the work of a large company.

GEOLOGICAL DATA

METHODS OF RECORDING USED BY THE CALUMET AND ARIZONA MINING Co.

At the present time the output of the mines of the Calumet and Arizona company is about 1600 tons per day. A little over 50,000 ft. of development work is done each year. In order that a good geological record be kept of all these openings the company employs in their geological department three inspectors, whose duty it is to visit each of the openings often enough to make note of and have sampled the formations exposed before the openings are lagged or filled.

The chief engineer of the company has charge of the geological department. Those in this department do no surveying and no mapping beyond tracing maps made by the mine surveyors.

The mine notes are taken in ordinary transit and cross-section books, the former books being used for the development work and the cross-section books for the stopes. In the office these notes are transferred to cards and maps which are indexed and filed away.

The legend used is shown in Fig. 242. It will be seen from this that we have different symbols for, Schist, Quartzite, Limestone, Conglomerate, Rhyolite, Granite, Iron pyrite, Copper Oxide ore, Copper Sulphide ore, Leached material, Broken lime, and various kinds of altered lime. Copper Oxide ore is all material carrying 4 per cent. or more copper and less than 10 per cent. sulphur. Copper Sulphide ore is all material carrying 4 per cent. or more copper and 10 per cent. or more sulphur.


















Legend		
Schist		Green
Quartzite		Yellow
Lime		Blue
Conglomerate		Variegated
Rhyolite		Green
Granite		Yellow
Pyrite (FeS_2)		Black
Oxide Ore		Crimson
Sulphide Ore		Crimson
Leached		Brown
Broken Lime		Blue
Altered Lime		Blue
Kaolinized Lime		Blue
Leached Lime		Blue And Brown
Pyritic Lime		Blue And Black
Siliceous Lime		Blue And Yellow
Lime Boulders		Blue

FIG. 242.

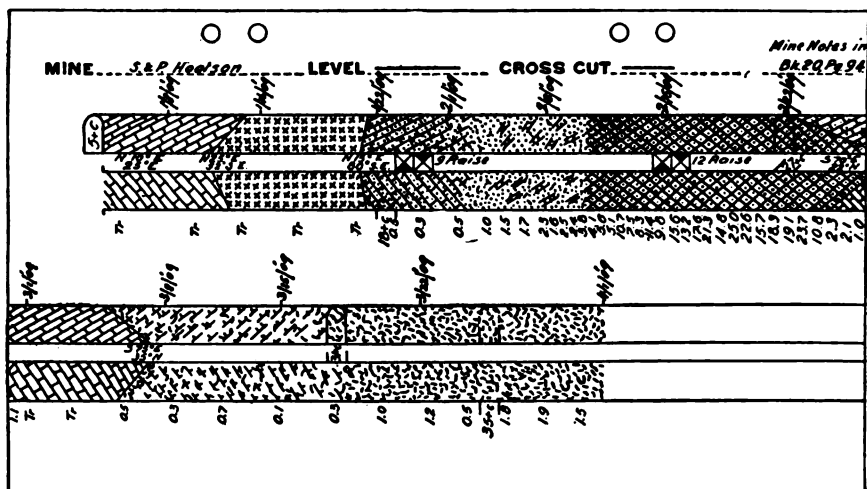


FIG. 243.

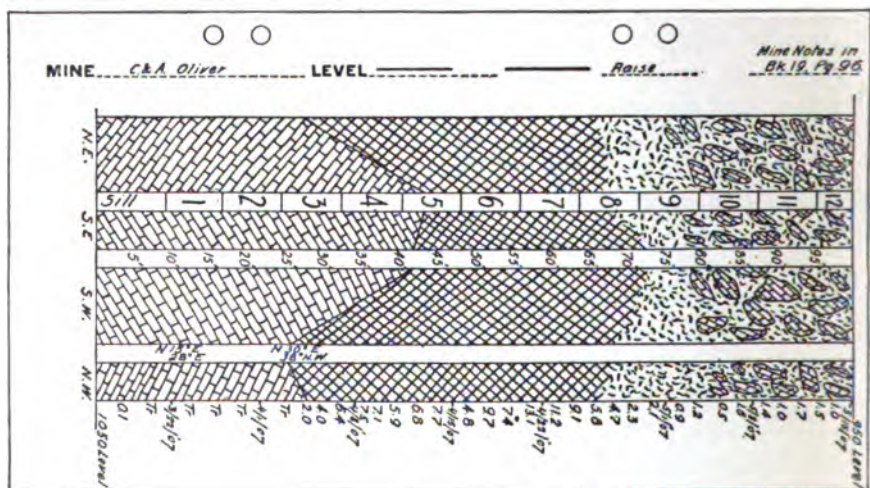


FIG. 244.

By combining the symbols we get all the gradations. For instance pyritic limestone is shown by combining the symbol of iron pyrite with the one of limestone and leached material. The legend shows all the rocks found in these mines. In the mine notes the symbols are shown in lead pencil, but in the office notes, colored inks are used to bring out the distinctions.

Field Notes.—In taking notes on the formation in the drifts, cross-cuts, and stations, the actual formation in the left wall and floor are

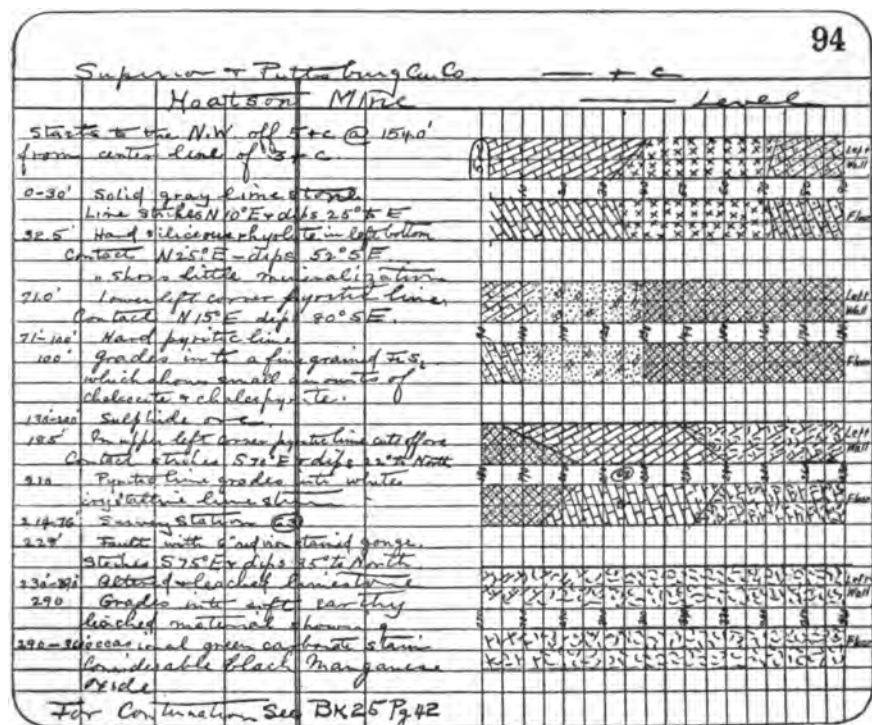


Fig. 245.

shown. The scale for the height or width of opening is not exact, but except for this the notes are drawn to scale as shown in Fig. 245.

On the left page of the transit book descriptive notes are written. The character of the material cut, contacts, faults, etc., are given; also the distance to the survey station used in measuring to contacts, etc. Anything else that will tend to make the record clear and complete is written down. The formation on the left wall and floor are shown diagrammatically on the right page.

In a similar manner the notes for raises, winzes, and shafts are taken,

the only difference being that instead of having but two walls shown, all four are sketched as shown in Fig. 246. These sketches are drawn to scale except for the width and length which are only approximate. The timber sets are shown on the sketch. The height of the sill set is 8 ft. 10 in. and the height of the other sets, 7 ft. 10 in. center to center.

As for the stope sketches, since nearly all the ground is mined by the square set system, the field notes show the sets taken out and the formation on each floor as shown in Fig. 247.

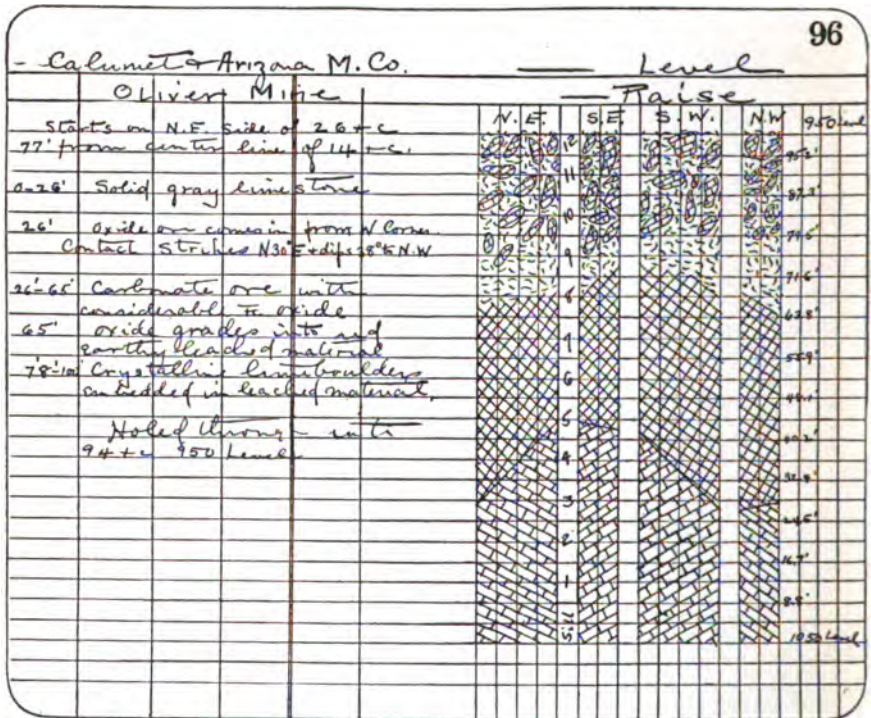


FIG. 246.

Each floor is plotted on a separate page. It is seldom that any other method of stoping is used, but when one is, points are established by the mine surveyors and these are used by the inspectors to make horizontal sections through the stope, at the intervals where the floors would come, were the square set method used.

Office Records.—In the office the mine notes are transferred to cards which are 5 in. × 9 in. and are cross-sectioned to inches and tenths of inches. The drifts, cross-cuts, stations, and stopes are plotted to a scale of 1 in. equals 25 ft. The shafts, raises, winzes are plotted to a

scale of 1 in. equals 12.5 ft. As in the mine notes the height and width of drifts, cross-cuts, and stations and the length and width of raises, winzes, and shafts are not plotted exactly to scale. The finished card

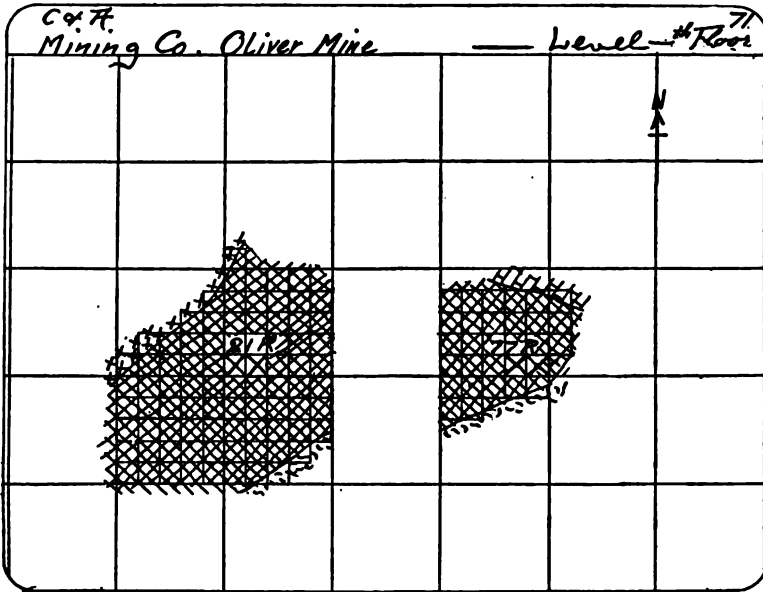


FIG. 247.

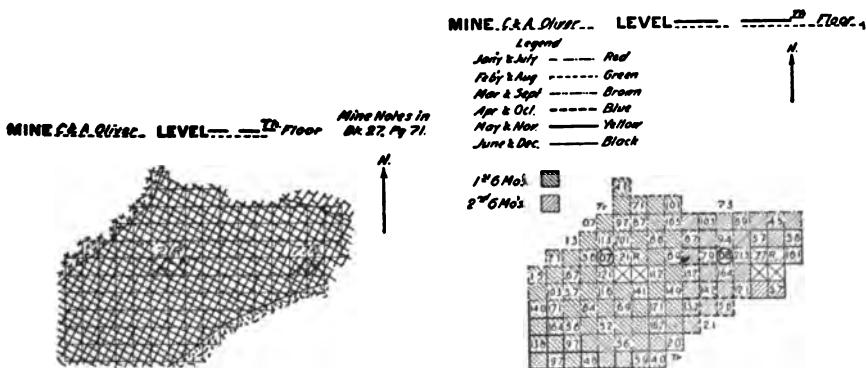


FIG. 248.

FIG. 249.

notes made from the mine notes, Figs. 245 and 246, are shown in Figs. 243 and 244 respectively. Except for the descriptive notes these cards show everything the field notes show. In addition to this, the cards

for the development work show by the dates the position of the breast, back, or bottom, as the case may be, on the 1st, 8th, 15th, and 22nd, of each month, provided that the opening has advanced during the preceding interval. They also show the field book and page from which

the card was made, all development work started from it, and also in red ink the assays for copper contained.

As for the office record of the stopes, see Figs. 248 and 249. Fig. 248 shows the sets removed and the formation. As there is not sufficient space on this card to show clearly the copper contents and the time of removal, a piece of tracing cloth is cut to fit over the stope card. On this the sets are drawn in colored inks and the percentage of copper is written in black ink at the places where the samples were taken, as shown in Fig. 249. The colored inks with the cross-sectioning show the month of the year that the ground was stoped. The year of removal is shown in black ink with a circle around it.

Formation Maps.—In order that the formation in each opening be shown in its relation to other openings, large maps, 53 in. \times 32 in. are drawn on tracing cloth to a scale of 1 in. equals 50 ft. There is a map made for each floor in the mine. On this, the formation is plotted from the cards as seen in Fig. 250, showing a portion of such a map.

These maps are made on tracing cloth so that they may be traced from the maps of the mine

surveyors, and also that they may be placed on top of each other so that the relations of the formation on the different elevations can be

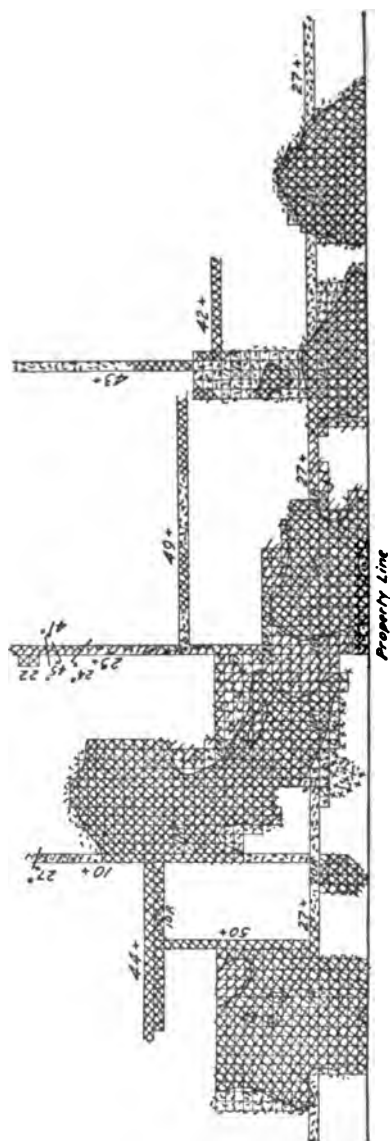


Fig. 250.

readily seen. Vertical cross-sections are made on tracing cloth wherever there is sufficient data to make them of use, these are made from the large 50 ft. to the 1 in. formation maps.

Estimates of ore reserves are made about once each year, for which the formation maps, together with the vertical sections are used.

INDEX

- Accident reports, 134
- Abstract, bills collectable, 215
 - voucher, 215
- Account, cash, 61, 68
 - closed, 214
 - company general, 3
 - company operating, 3
 - company team, 88
 - depreciation, 209
 - expense, 269
 - general plant, depreciation of, 208
 - gold, 279
 - mine, general, 3, 5
 - mine, profit and loss, 5
 - miscellaneous, profit and loss, 13
 - plant, 283
 - profit and loss, 5
 - stable, 287
 - treasurer's, 68
 - Victor Mill, 297
 - wash, 95
- Accounts, closed, 75, 174
 - closed mill, 93
 - construction, 95
 - deferred, 95
 - development, 97
 - distributed mine, 288
 - distributing, 28
 - expense, 169
 - general ledger, 64
 - head office ledger, 58, 60, 277
 - inventory, 16
 - ledger, general office, 205, 206
 - Wasatch Store Co., 269
 - mine, 63, 282
 - open pit mines, 35
 - underground mines, 26
 - mining expense, open pit mines, 36
 - underground mines, 32
 - new construction, 9
 - operating, 150, 169
 - receivable, 6, 61, 74, 278, 283
 - shop, 74
 - sub-mine, 95, 285
 - supply, 16
 - surface expense, 33
- Accounting, general ledger, 3
 - general, mine books, 107
 - general office and mine, 6, 214
 - general statement of, 180, 297
 - general, sub-ledger, 5
 - methods, Oliver Iron Mining Co., 1
 - Calumet & Arizona Mining Co., 168
 - Ojibway Mining Co., 58
 - Portland Gold Mining Co., 275
 - Utah Con. Mining Co., 148
 - Utah Fuel Co., 203
 - Wasatch Store Co., 269
 - mine office, 235
- Additional expenditures, details of, 235
- Administrative expense, 28
- Advertising, 9
- Agencies and commissions, outside, 9
- Agent, mine, 61
- Aid fund, 70
 - rules, 70
- Air lines, 82
- Ammunition order, 294
- Analysis, 9
- Animal reports, 255
- Animals, depreciation of, 210
 - killed and sold, 209, 223, 255
- Application for dwelling, 89
- Applying for situation, 183
- Assaying and sampling, 295
- Assessments, 60
- Assets, 62
- Attendance, medical, 72
- Audited bills, 69
- Auxiliary hoists, 289
 - records, 210-213
- Balance sheet, 234, 273, 281
- Bills audited, 69
 - collectable, 251
 - abstract of, 215
 - ledger, 215
- Blacksmiths, 75
- Blacksmith shop, 288
 - expense, 180
- Blasting, drilling and, 37, 38
 - report, 154, 157

- Boarding-house expenditures, 208
 - fixtures, 206
 - receipts, 208
 - receipts and expenditures, 252
 - record of meals served, 251
 - reports, 223
- Boilers, 151
- Boiler-house expense, 174
 - room, 288
 - record, 174
- Books, calculation, 326
 - field, surveying, 325
 - office stope, 327
 - progress, 332
 - and stationery, coupons, 270
- Boston & Montans Con. Copper & Silver Mining Co., 325
 - books, calculation, 326
 - office stope, 327
 - progress, 332
 - surveying field, 325
 - calculation books, 326
 - of ore reserves, 333
 - calculations, survey, 326
 - engineering data, methods of recording, 325
 - field books, surveying, 325
 - notes, recording, 325
 - maps, surface, 328
 - underground, 328
 - mine openings, system of numbering, 329, 332
 - numbering mine openings, system of, 329, 332
 - office records, survey, 327
 - office stope books, 327
 - openings, system of numbering mine, 329, 332
 - ore reserves, calculation of, 333
 - platting surveys, 328
 - progress books, 332
 - report, 332
 - recording field notes, 326
 - records, survey office, 327
 - report, progress, 332
 - sketches, underground, 330
 - stope books, office, 327
 - survey calculations, 326
 - office records, 327
 - surveying field books, 325
 - surveys, platting, 328
 - underground sketches, 330
- Breaking and crushing ore, 34
 - ore, 285
- Briquetting press expense, 177
- Buildings, 206, 269, 286
 - and chutes, repairs to, 212
 - and fixtures, 151
 - repairs to, 178, 214
 - saloon, 207
- Bullion, loading expense, 177
- Burning and drawing, 213
- Cage and skip tenders, 33
- Calculation books, 326
 - of ore reserves, 333
- Calculations, survey, 326
- Calumet & Arizona Mining Co., smelter, 168
 - accounting methods, 168
 - accounting, general statement, 180
 - accounts, closed, 174
 - expense, 169
 - operating, 169
 - applying for situation, 183
 - blacksmith shop expense, 180
 - boiler-room expense, 174
 - record, 174
 - briquetting press expense, 177
 - buildings, repair of, 178
 - bullion, loading expense, 177
 - carpenter-shop expense, 180
 - closed accounts, 174
 - coke, delivering expense, ore and, 177
 - converter expense, 170
 - copper ore, smelting, 168
 - cost sheets, 190
 - crane expense, 178
 - distribution of labor, 186
 - dwellings, report of, 178
 - electric plant expense, 178
 - power record, 178
 - electric shop expense, 180
 - engaging labor, 182
 - engineering expense, 179
 - engineering data, 317
 - geological data, 335
 - expense accounts, 169
 - bills, freight, 182
 - blacksmith shop, 180
 - boiler house, 174
 - briquetting press, 177
 - carpenter shop, 180
 - converter, 170

Calumet & Arizona Mining Co. (Cont'd)

- crane, 178
- delivering ore and coke, 177
- electric plant, 178
- electrical shop, 180
- engineering, 179
- furnace, 170
- general, 169
- hauling slag, 178
- laboratory, 174
- lighting, 178
- loading bullion, 177
- machine shop, 180
- mud mill, 177
- office, 169
- ore sampling, 179
- power house, 177
- pumping, 177
- warehouse, 178
- freight expense bills, 182
- fuel oil tests, 176
- furnace expense, 170
 - report, daily, 173
 - monthly, 173
- gas analysis report, 174
- general expense, 169
- invoices, 180
- labor, distribution of, 186
 - engaging, 182
 - reference, investigation of, 183
- laboratory expense, 174
- lighting expense, 178
- machine shop expense, 180
- methods of recording engineering data, 317
 - composite maps, 324
 - elevation card, 319
 - engineering data, 317
 - recording, forms used for, 317
 - forms used for recording engineering data, 317
 - maps, composite, 324
 - stope, 324
 - measurement card, 319
 - total card, 322
- mine openings, system of numbering, 317
- numbering mine openings, system of, 317
- Raise & Winze card, 321
- recording engineering data, forms used for, 317

Calumet & Arizona Mining Co. (Cont'd)

- sketch card, 319
- stope card, 321
 - maps, 324
 - total card, 323
- survey cards, 318
- system of numbering mine openings, 317
- tracings, 324
- Winze card, Raise &, 321
- methods of recording geological data, 335
 - field notes, 337
 - formation maps, 340
 - geological data, 335
 - legend, 335
 - maps, formation, 340
 - mine notes, 335
 - notes, field, 337
 - mine, 335
 - office records, 338
 - records, office, 338
- moistures, ore, 188
- mud mill expense, 177
- office expense, 169
- operating accounts, 169
- ore moistures, 188
- ore shipments received, 188
- ore in stock, 190
 - unloading, 179
- payrolls, 186
- power-house expense, 177
- production statement, 190
- pumping expense, 177
- record, boiler-room, 174
 - electric power, 178
 - water treatment, 174
 - voucher, 180
- reference, labor investigation, 183
- refinery results, 190
- repair of buildings, 178
 - dwellings, 178
- report, furnace, daily, 173
 - monthly, 173
 - gas analysis, 174
 - smelter, 173
- results, refinery, 190
- sampling expense, ore, 179
- shipments of ore received, 188
- situation, applying for, 183
- slag, hauling expense, 178
- smelter report, daily, 173

- Calumet & Arizona Mining Co. (Cont'd)
 smelting copper ore, 168
 stock, ore in, 190
 supplies, 181
 tests, fuel oil, 176
 timebooks, 184
 unloading ore, 179
 voucher record, 180
 warehouse expense, 178
 water treatment record, 174
 Capital stock, 58, 278
 Captains, mining, 33, 37, 38
 Carpenters, 74
 Carpenter-shop expense, 180
 and surface, 288
 Cars and rails, 287
 Cars, repairs to, 211
 repairs, locomotives and, 37
 and tracks, 151, 206
 underground, 83
 Cash, 278, 283
 account, 61, 68
 book, 107, 214, 268, 297
 Cement, etc., 105
 Change house, dry and, 33
 Charging ovens, 213
 Check register, 108
 roll, 44
 Checks, pay, 116
 Chemistry, surveying and, 34, 39
 Chutes, repairs to buildings and, 212
 and trestles, tramways, 206
 Cinders, loading, 214
 Claims, 131
 personal injury, 208
 Classification, labor, 46
 surface labor, 113, 117
 underground labor, 113, 117
 Clearing land, 89
 Clerks, superintendence and, 212, 213
 Closed account, 214
 accounts, 75, 174
 mill, 93
 Coal, Blossburg, 106
 and coke mined and shipped, 207
 cost to consumers, 204
 expense, sub-accounts, 210
 hard, 106
 mined and distribution, report of, 268
 mined, record of, 238
 mining, and making coke, 203
 sales ledger, 215
- Calumet & Arizona Mining Co. (Cont'd)
 soft, 106
 used, 213
 Coke, 106
 cost of, to consumers, 204
 delivering expense, ore and, 177
 expense, 207
 sub-accounts, 213
 experiments, 214
 loading, 213
 making, and mining coal, 203
 mined and shipped, coal and, 267
 operations, record of, 267
 ovens, 206
 cost sheet, 224
 repairs to, 214
 Collectable, bills, 251
 Commission, outside agencies and, 9
 Companies and individuals, 210, 272
 subsidiaries of Utah Fuel Co., 203
 Company, general account, 3
 expense, 7
 operating account, 3
 team account, 88
 Comparative cost statement, 134
 statement of operations, 230
 Composite maps, 324
 Compressing, 288
 Compressor, 79, 151
 and air drills, 31
 report, 79
 Construction, 61, 64
 accounts, 95
 new, 9
 schedule for, 10, 95
 new, 5
 supplies charged to, 130
 Consumed, supplies, 17
 Contract book, 44
 curves, 154
 stripping, 38
 Contributions, 34, 39
 Converter expense, 170
 Conveyor, 94
 Copper, 61
 cost of, to consumers, 59
 mining and milling native, 58
 ore, mining, 149
 smelting, 168
 Corrections, journal of, 268
 Cost of coal to consumers, 204
 coke to consumers, 204

- Cost of copper to consumers, 59
 - gold at the mint, 276
 - iron ore at the furnace, 4
 - ore at the mines, 6
 - upper ports, 6
 - lower ports, 6
 - property, 206
 - sheet, coke ovens, 224
 - general, 6, 313
 - mine, 6, 230
 - sheets, 134, 190
 - statement, comparative, 134
- Coupon report, 272
- Coupons, books and stationery, 270
 - outstanding, 272
- Crane expense, 178
- Crushing ore, breaking and, 34
- Cross-cuts, 286
- Current liabilities, 274
- Curves, contract, 154
 - payday, 157
- Dead work, 212
- Deductions, payroll, 223, 242
- Deferred Accounts, 74
 - charges, 5, 15
- Deficiency, payroll, 209
- Depreciation, 15, 222, 272
 - account, 209
 - of animals, 210
 - of general plant account, 208
- Details of general expense, 222
- Development, 64, 150, 283
 - accounts, 97
 - schedule for, 130
 - mine, 206
 - in ore, 32
 - in rock, 32
 - report, 134
 - sheets, stope and, 313
 - stripping and, 37
 - supplies charged to, 130
- Diamond drilling records, 98
- Direct expense, general office, 7
 - mine expense, 7
- Disbursements, 21
 - receipts and, 21, 281
- Discount and exchange, interest, 209
 - interest and, 62
- Distributed mine accounts, 288
- Distributing Accounts, 28
- Distribution of coal mined, report of, 268
- Distribution of coke oven payrolls, 247, 248
 - labor, 186, 238, 300
 - mine payrolls, 244, 248
 - power drills, 80
- District expense, 7
- Districts, iron mining, 1
- Dividends, 279
 - unclaimed, 280
- Drainage tunnel, 279
 - and watering mine, 211
- Drawing, burning and, 213
- Drifts, 286
- Drill machine report, 161
 - record, power, 81
- Drills, compressor and air, 31
 - distribution of power, 80
 - machine, 288
 - power, 79
 - sharpening report, 80
- Drilling and blasting, 37, 38
 - records, diamond, 98
 - report, 163
- Driving entry, 211
- Dry and change houses, 33
- Dwellings, application for, 89
 - lease, 89
 - repairs to, 178
- Earnings, 207, 269
 - estimated tonnage and, 268
 - tonnage and, 224
- Electric lights, 151, 211
 - light and power, 76, 94
 - plant, 290
 - expense, 178
 - report, 76
 - power, 28
 - record, 178
 - shop expense, 180
 - supplies, 106
- Electricians, 75
- Elevation cards, 319
- Elevators, screens, and, 94
- Engaging labor, 111, 182, 297
- Engineering, 212-213
 - department, 75
 - and laboratory, 151
 - expense, 179
 - property, 209
 - data, methods of recording, 317, 325
 - recording, forms used for, 317

- Engineer's logs, 28
- Entertainment, traveling and, 9
- Entries, journal, 107
- Entry driving, 211
- Equipment, permanent, 279
 - rental of, 131
 - transfer of supplies and, 221
- Exchange, interest, discount and, 209
- Expenditures, 63
 - boarding house, 208
 - receipts and, 252
 - general, 64
- Expense account, 269
 - accounts, 169
 - mine, 6
 - mining, open pit mines, 36
 - bills, freight, 182
 - blacksmith-shop, 180
 - boiler-house, 174
 - briquetting press, 177
 - coal, sub-accounts, 210
 - coke, 207
 - carpenter shop, 180
 - company general, 7
 - converter, 170
 - crane, 178
 - delivering ore and coke, 177
 - direct mine, 7
 - district, 7
 - electrical shop, 180
 - electric plant, 178
 - engineering, 179
 - furnace, 170
 - general, 7, 61, 95, 151, 169, 207, 208, 213, 280, 296
 - mining, 39
 - office, direct, 7
 - stripping, 38
 - surface, 34,
 - underground, 33, 85
 - hauling slag, 178
 - hoisting, 33
 - laboratory, 174
 - law, 207
 - legal, 8, 62, 280
 - lighting, 178
 - loading bullion, 177
 - machine shop, 180
 - mine, 207
 - mining, 38, 65, 98, 210, 279
 - mud mill, 177
 - office, 8, 34, 37, 39, 61, 68, 169, 280, 296
- Expense, operating, 6, 61
 - ore sampling, 179
 - other, 286
 - power house, 177
 - pumping, 177
 - stamping, 102
 - stock pile, 39
 - surface, 68, 151
 - track, 37, 38
 - warehouse, 178
 - waste pile, 37
 - winter, 36
- Expenses, administrative, 28
 - details of general, 222
 - extraordinary, 216
 - general office, salaries and, 207
 - shop, 31
 - special, 9
- Experiments, coke, 214
- Experimental work, 9
- Exploring, 150
- Exploration, mine, 33
- Explosives, 105, 152, 287, 294
- Extraordinary expense, 216
- Field books, surveying, 325
 - notes, 337
 - notes, recording, 325
- Financial statement, 62, 230, 273, 280
- Firing cold ovens, 214
- Fittings, pipe and, 105
- Fixtures, boarding house, 206
 - buildings and, 151
 - furniture and, 60, 279
 - office, 287
 - furniture and, 8
- Forage report, 256
- Formation maps, 340
- Forms used for recording engineering data, 317
- Freight, 286
 - expense bills, 182
 - received record, 124
- Fuel, 74, 152, 287, 294
 - oil tests, 176
 - stamp mill, 106
- Fund, aid, 70
 - personal injury, 209
 - special renewal, 209
- Furnace expense, 170
 - reports, 173

- Furniture and fixtures, 60, 279
 - office, 8
- Gas analysis report, 174
- General, 62
 - accounting, mine books, 107
 - cost sheet, 6
 - expenditures, 64
 - expense, 7, 61, 95, 151, 169, 207, 208, 213, 280, 296
 - company, 7
 - expenses, details of, 222
 - mining expense, 39
 - office, 152
 - accounting, 215
 - direct expense, 7
 - and mining accounting, 6
 - salaries and expenses, 207
 - repairs, 38
 - supplies, 105
 - surface expense, 34
 - underground expense, 33
- Geological data, methods of recording, 335
- Gold account, 279
 - cost of at the mint, 276
 - ore, mining and milling, 275
- Grading highways, 34
- Graphic records, 153
- Grease, oils and, 106
- Hand, loading stockpile by, 33
 - mining by, 38
 - stripping by, 37
 - tramming by, 32
- Haulage system, waste, 291
- Hauling, 210
- Head office, ledger accounts, 58, 60, 277
- Headworks, 287
- Heating, 151
 - system, 88
- Highways, 89
 - grading, 34
- Hoist report, 290
- Hoists, auxiliary, 289
- Hoisted, monthly record of rock, 86
 - summary of rock, 88
- Hoisting, 85, 151, 285, 290
 - expense, 33
 - record, 86
 - records, summary of, 88
 - ropes, 106
- Hospital, 285
- Houses, ore, 291
- Improvements, 12, 219
- Incidentals, 68, 213, 214
- Income account, 231, 234, 273
- Individuals and companies, 210, 272
- Injuries, personal, 34, 39
- Injury claims, personal, 208
 - fund, personal, 209
- Insurance, 13, 69, 208, 272, 280, 283
 - marine, 14
- Interest and discount, 62
 - discount and exchange, 209
- Inventory accounts, 16
- Invoices, 39, 125, 180, 216, 250, 307
- Iron mines, 1
 - and steel, 105
 - mining districts, 1
 - ranges, 1
 - ore, cost of at the furnace, 4
 - mining, 1
- Jigs, 94
- Job orders, 118
 - records, 119
- Journal, 107, 215, 268
 - of corrections, 268
 - entries, 107
 - miscellaneous, 41
- Labor charges, etc., transfer of supplies, 24
 - chart, tonnage and, 152
 - classification, 46
 - surface, 113, 117
 - underground, 113, 117
 - distribution of, 186, 238, 300
 - engaging, 111, 182, 297
 - reference, investigation of, 183
 - report, 164
 - sheets, 57, 69
- Laboratory, 31, 95
 - and engineering department, 151
 - expense, 174
- Land, clearing, 89
 - lease, 89
- Lands, 206
- Law expense, 207
- Lease, dwelling, 89
 - land, 89

- Ledger, 42, 215, 268
 - accounts, general, 64
 - Wasatch Store Co., 269
 - accounting, 3
 - sub-general, 5
 - Bills collectable, 215
 - coal sales, 215
 - ore, 43
 - stockpile, 44
- Ledgers, 107
- Legal expense, 8, 62, 280
- Legend, 335
- Liabilities, 62
 - current, 274
- Light and power, electric, 76, 94
- Lighting, 37, 38, 295
 - expense, 178
- Lights, electric, 151
- Litigation, 280
- Leading, 211
 - cinders, 214
 - coke, 212
 - stock-pile, steam shovel, 33
 - hand, 33
- Locomotives and cars, repairs to, 37, 38
 - operating, 37, 38
- Logs, engineers, 28
- Loss and gain, 61, 278
 - on supplies, adjustment, 106
- Lower ports, cost of ore at, 6
 - ore at, 5, 18
- Lumber and timber, 105, 152, 287, 294
- Machine drills, 288
 - report, 164
 - report, 161
 - shop, 288
 - expense, 180
- Machinery, 105, 151, 287
 - power and, 206
 - for prospecting, 207
 - rentals, 25
 - repairs to, 212
- Machinists, 74
- Machineman's report, 288
- Manufactured supplies, 17
- Manufacturing supplies, 106
- Maps, composite, 324
 - formation, 340
 - stope, 324
 - surface, 328
 - underground, 328
- Marine insurance, 14
- Masons, 75
- Material received register, 307
- Meals served, record of, 251
- Measurement card, 319
 - total card, 322
- Medical attendance, 72
- Merchandise bought, 269
 - sales, 269
- Mill, Portland, 279-286
 - report, 103
 - saw, 210
 - Victor, 279
- Milling, 283
 - gold ore, mining and, 275
 - native copper, mining and, 58
- Mine accounts, 63, 282
 - distributed accounts, 288
 - expense accounts, 6
 - open pit mines, 35
 - underground mines, 26
 - sub-accounts, 285
 - agent, 61
 - cost sheet, 6, 230
 - development, 206
 - expense, 207
 - district, 7
 - explorations, 33
 - notes, 335
 - office, 105
 - accounting, 39, 235
 - openings, system of numbering, 317, 329, 332
 - operations, record of, 267
 - report, 133, 164
 - profit and loss account, 5
- Mined coal and coke, shipped and, 267
- Mines, coal, 203
 - cost of ore at, 6
 - iron, 1
 - ore at, 5, 18
 - reports received from, 222
- Mining captains, 33, 37, 38
 - coal and making coke, 203
 - copper ore, 149
 - districts, iron, 1
 - expense, 38, 65, 98, 210, 279
 - accounts, open pit mines, 36
 - underground mines, 32
 - general, 39
 - hand, 38
 - iron ore, 1

- Mining and milling gold ore, 275
 - native copper, 58
 - property, 60
 - ranges, iron, 1
 - supplies, 16
 - and surface, vouchers charged to, 43
- Mineral and mass copper shipped,
 - reports, 67
 - reports, 103
- Miscellaneous, 34, 280
 - journal entries, 41
 - profit and loss, 13
- Moistures, ore, 188
- Mud mill expense, 177
- Nationality report, 134, 256
- New construction, 5
 - tramway, 151
- Notes, field, 337
 - mine, 335
 - receivable, 61
- Numbering mine openings, system of,
 - 317, 329, 332
- Office accounting, general, 215
 - expense, 8, 34, 37, 39, 61, 68, 169, 280, 296
 - fixtures, 287
 - furniture and fixtures, 8
 - general, 152
 - ledger accounts, 205, 206
 - reports made at, 223
 - mine, 105
 - orders, 123
 - purchasing agent, 105
 - records, 338
 - survey, 327
 - reports to general, 47
 - stope books, 327
- Officers' salaries, 280
- Oils and grease, 106
- Ojibway Mining Co., methods of accounting, 58
 - accident reports, 134
 - account, cash, 61, 68
 - company team, 88
 - treasurer's, 68
 - wash, 95
 - accounts, closed, 75
 - mill, 93
 - construction, 95
 - deferred, 74
- Ojibway Mining Co. (Cont'd)
 - development, 97
 - general ledger, 64
 - head office, ledger, 58-60
 - mine, mine books, 63
 - receivable, 61, 74
 - shop, 74
 - sub, 95
 - accounting, general, mine books, 107
 - agent, mine, 61
 - aid fund, 70
 - rules, 70
 - air lines, 82
 - application for dwelling, 89
 - assessments, 60
 - assets, 62
 - attendance, medical, 72
 - audited bills, 69
 - bills audited, 69
 - blacksmiths, 75
 - capital stock, 58
 - carpenters, 74
 - cars, underground, 83
 - cash account, 61, 68
 - book, 107
 - cement, etc, 105
 - check register, 108
 - checks, pay, 162
 - claims, 131
 - classification, underground, labor,
 - 113, 117
 - surface labor, 113, 117
 - clearing land, 89
 - closed accounts, 75
 - mill, 93
 - coal, Blossburg, 106
 - hard, 106
 - soft, 106
 - coke, 106
 - company team account, 88
 - comparative cost statement, 134
 - compressor, 79
 - report, 79
 - construction, 61, 64
 - accounts, 95
 - schedule for, 95
 - supplies charged to, 130
 - conveyor, 94
 - copper, 61
 - cost of to consumers, 59
 - mining and milling native, 58
 - cost of copper to consumers, 59

Ojibway Mining Co. (Cont'd)

- cost sheets, 134
 - statement, comparative, 134
- deferred accounts, 74
- development, 64
 - accounts, 97
 - schedule for, 130
 - report, 134
 - supplies charged to operation and, 130
- diamond drilling records, 98
- discount, interest and, 62
- distribution of power drills, 60
- drill record, power, 81
 - sharpening report, 80
- drills, distribution of power, 80
 - power, 79
- drilling records, diamond, 98
- dwelling, application for, 89
 - lease, 89
- electricians, 75
- electric light and power, 76, 94
 - plant report, 76
 - supplies, 106
- elevators, screens and, 94
- engaging labor, 111
- engineering department, 75
- entries, journal, 107
- equipment, rental of, 131
- expenditures, 63
 - general, 64
- expense, general, 61, 95
 - underground, 85
 - legal, 62
 - mining, 65, 98
 - office, 61, 68
 - operating, 61
 - stamping, 102
 - surface, 68
- explosives, 105
- financial statement, 62
- fittings, pipe and, 105
- fixtures, furniture and, 60
- freight received record, 124
- fuel, 74
 - stamp mill, 106
- fund, aid, 70
- furniture and fixtures, 60
 - general, 62
 - accounting, mine books, 107
 - expenditures, 64
 - expense, 61, 95
 - supplies, 105

Ojibway Mining Co. (Cont'd)

- grease, oils and, 106
- head office, ledger accounts, 58-60
- heating system, 88
- highways, 89
- hoisted, monthly record of rock, 86
 - summary of rock, 88
- hoisting, 85
 - record, daily, 86
 - records, summary of, 88
 - ropes, 106
- incidentals, 68
- insurance, 69
- interest and discount, 62
- invoices, 125
- iron and steel, 105
- jigs, 94
- job orders, 118
 - records, 119
- journal, 107
 - entries, 107
- labor, engaging, 111
 - classification, underground, 113, 117
 - surface, 113, 117
 - sundry, 69
- laboratory, 95
- land, clearing, 89
 - lease, 89
- lease, dwelling, 89
 - land, 89
- ledger accounts, general, 64
- ledgers, 107
- legal expense, 62
- liabilities, 62
- light and power, electric, 76, 94
- loss and gain, 61
 - on supplies, adjustment, 106
- lumber and timber, 105
- machinery, 105
- machinists, 74
- manufacturing supplies, 106
- masons, 75
- medical attendance, 72
- mill report, daily, 103
- milling native copper, mining and, 58
- mine accounts, mine books, 63
 - agent, 61
 - office, 105
 - report, daily, 133
- mining expense, 65, 98
 - and milling native copper, 58
 - property, 60

Ojibway Mining Co. (Cont'd)

- mineral and mass copper shipped, reports, 67, 103
- nationality report, 134
- notes receivable, 61
- office expense, 61, 68
 - mine, 105
 - orders, 123
 - purchasing agent, 105
- oils and grease, 106
- operating accounts, schedule for, 130
- operations and development, supplies charged to, 130
- orders, job, 118
 - office, 123
 - purchase, 123
- pay checks, 116
- pay roll, 115
- payable, vouchers, 58
- pedigree records, 111
- pipe and fittings, 105
- plant, steam, 75, 93
- postage and stationery, 62
- power, electric light and, 76, 94
 - drills, 79
- property, mining, 60
- pumping, 85, 94
- purchase orders, 123
 - of supplies, 121
- purchasing agent, office of, 105
- receipts, 62
- receivable accounts, 61, 74
 - notes, 61
- record, freight received, 124
 - hoisting, daily, 86
 - power drill, 81
 - rock hoisted, monthly, 86
 - supplies used, 127
 - tramming, monthly, 83
 - voucher, 108
- records, diamond drilling, 98
 - job, 119
 - pedigree, 111
 - rent, 93
 - stock, 126
 - summary of hoisting, 88
- register, check, 108
- regrinding, 94
- rent records, 93
- rents, 89, 95
- rental of equipment, 131
- report, compressor, 79
 - development, 134

Ojibway Mining Co. (Cont'd)

- distribution of power drills, 80
- drills sharpened, 80
- electric plant, 76
- mill, daily, 103
- mine, daily, 133
- mineral, daily, 103
- nationality, 134
- rock trammed, 83
 - shipped, 66
- steam plant, 75
- supply, daily, 103
- trammer bosses', 82
- reports, accident, 134
 - mineral and mass copper shipped, 67
 - rock shipped, train, 66
- requisitions, supply, 123
- rock hoisted, monthly record, 86
 - summary of, 88
- rock house, 88
 - shipped, train reports, 66
 - trammed report, 83
- rolls, 94
- ropes, hoisting, 106
- rules, aid fund, 70
- salaries, 62
- schedule for construction accounts, 95
 - development accounts, 130
 - operation accounts, 130
- screens and elevators, 94
- selling, smelting and, 62
- settlements, 112
- shop accounts, 74
- smelting and selling, 62
- stamping, 68, 102
- stamp mill, closed accounts, 93
 - fuel, 106
 - supplies, 106
- statement, financial, 62
- stationery, postage and, 62
- steam plant, 75, 93
 - report, 75
- steel, iron and, 105
- stock, capital, 58
 - records, 126
- stoping, 98
- sub-accounts, 95
- subscription, 60
- sundry labor, 69
- supply report, daily, 103
 - requisitions, 123

Ojibway Mining Co. (Cont'd)

- supplies, 74
 - charged to construction, 130
 - operation and development, 130
 - electric, 106
 - general, 105
 - loss and gain on, adjustment, 106
 - manufacturing, 106
 - purchase of, 121
 - stamp mill, 106
 - used, record of, 127
- surface expense, 68
- tables and vanners, 94
- taxes, 69
- team account, company, 88
- teaming, 74
- timber, lumber and, 105
- timbering, 83
- timebooks and timekeeping, 112
- Tools, 106
- tracks, underground, 83
- train reports, rock shipped, 66
- trammer bosses report, 82
- trammed, report of rock, 83
- tramping, 82
 - monthly record of, 83
- transportation, 65
- treasurer's account, 68
- trial balance, 62
- underground cars, 83
 - expense, general, 85
 - tracks, 83
- vanners, tables and, 94
- voucher record, 108
- vouchers, 111
 - payable, 58
- wash account, 95
- water supply, 88
- wood, boiler, 106
 - family, 106

Oliver Iron Mining Co., methods of

- accounting, 1
- account, company, general, 3
 - operating, 3
 - mine, general, 3, 5
 - profit and loss, 5
 - miscellaneous profit and loss, 13
 - profit and loss, 5
- accounts, distributing, 28
- inventory, 16
- mine books, underground mines, 26
- open pit mines, 35

Oliver Iron Mining Co. (Cont'd)

- mining expense, open pit mines, 36
 - underground mines, 32
- new construction, 9
- receivable, 6
- supply, 16
- surface expense, 33
- accounting, general ledger, 3
 - general office and mine, 6
 - sub-ledger, 5
- administrative expense, 28
- advertising, 9
- agencies and commissions, outside, 9
- analysis, 9
- blasting, drilling and, 37, 38
- breaking and crushing ore, 34
- cage and skip tenders, 33
- captains, mining, 33, 37, 38
- cars, repairing locomotives and, 37
- change houses, dry and, 33
- check roll, 44
- chemistry, surveying, and, 34, 39
- classification, labor, 46
- commissions, outside agencies and, 9
- company, general account, 3
 - expense, 7
 - operating account, 3
- compressor and air drills, 31
- construction accounts, new, 9
 - schedule for, 10
 - new, 5
- consumed, supplies, 17
- contract book, 44
 - stripping, 38
- contributions, 34, 39
- cost of iron ore at the furnace, 4
 - ore at the mines, 6
 - upper ports, 6
 - lower ports, 6
- cost sheet, general, 6
 - mine, 6
- crushing ore, breaking and, 34
- deferred charges, 5, 15
- depreciation, 15
- development in ore, 32
 - rock, 32
 - stripping and, 37
- direct expense, general office, 7
 - mine expense, 7
- disbursements, 21
 - receipts and, 21
- distributing accounts, 28
- district expense, 7

Oliver Iron Mining Co. (Cont'd)

- districts, iron mining, 1
- drills, compressor and air, 31
- drilling and blasting, 37, 38
- dry and change houses, 33
- electric power, 28
- engineers' logs, 28
- entertainment, traveling and, 9
- expense accounts, mine accounts, 6
 - mining, open pit mines, 36
- company, general, 7
- direct mine, 7
- district, 7
- general, 7
 - mining, 39
 - office, direct, 7
 - stripping, 38
 - surface, 34
 - underground, 33
- hoisting, 33
- legal, 8
- mining, 38
- office, 8, 34, 37, 39
- operating, 6
- stockpile, 39
- track, 37, 38
- waste pile, 37
- winter, 36
- expenses, administration, 28
 - shop, 31
 - special, 9
- experimental work, 9
- exploration, mine, 33
- fixtures, office furniture and, 8
- furniture and fixtures, office, 8
- general cost sheet, 6
 - expense, 7
 - company, 7
 - mining expense, 39
 - office, direct expense, 7
 - and mine accounting, 6
 - repairs, 38
 - surface expense, 34
 - underground expense, 33
- grading highways, 34
- hand, loading stockpile by, 33
 - mining by, 38
 - stripping by, 37
 - tramming by, 32
- highways, grading, 34
- hoisting expense, 33
- improvements, 12
- injuries, personal, 34, 39

Oliver Iron Mining Co. (Cont'd)

- insurance, 13
 - marine, 14
- inventory accounts, 16
- invoices, 39
- iron mines, 1
 - mining districts, 1
 - ranges, 1
 - ore, cost of, at the furnace, 4
 - mining, 1
- journal entries, miscellaneous, 41
- labor charges, etc., transfer of supplies, 24
 - classification, 46
 - sheets, 57
- laboratory, 31
- ledger, 42
 - accounting, 3
 - sub-general, 5
 - ore, 43
 - stockpile, 44
- legal expense, 8
- lighting, 37, 38
- loading stockpile, steam shovel, 33
 - hand, 33
- locomotives and cars, repairs to, 37, 38
 - operating, 37, 38
- log, daily engineers, 28
 - monthly engineers, 28
- lower ports, cost of ore at, 6
 - ore at, 5, 18
- machinery rentals, 25
- manufactured supplies, 17
- marine insurance, 14
- mine accounts, expense accounts, 6
 - mine books, underground mines, 26
 - open pit mines, 35
 - cost sheet, 6
 - expense, district, 7
 - exploration, 33
 - general account, 3-5
 - office accounting, reports, etc., 39
 - profit and loss account, 5
- mines, cost of ore at, 6
 - iron, 1
 - ore at, 5, 18
- mining captains, 33, 37, 38
 - districts, iron, 1
 - expense, 38
 - expense accounts, open pit mines, 36

Oliver Iron Mining Co. (Cont'd)

- underground mines, 32
 - general, 39
- hand, 38
- iron ore, 1
- ranges, iron, 1
- supplies, 16
- and surface, vouchers charged to, 43
- miscellaneous, 34
 - journal entries, 41
 - profit and loss, 13
- new construction, 5
- office expense, 8, 34, 37, 39
 - furniture and fixtures, 8
 - reports to general, 47
- operating expense, 6
 - locomotives, 37, 38
 - steam shovels, 33, 37, 38
- ore, breaking and crushing, 44
 - development in, 32
 - ledger, 43
 - at lower ports, 5, 18
 - cost of, 6
 - at mines, 5, 18
 - cost of, 6
 - from pockets, shipping, 33
 - and rock statement book, 43
 - stocking and sorting, 33
 - at upper ports, 5, 18
 - cost of, 6
- orebody, removing rock in, 39
- overruns and shortage, 23
- payrolls, 19
 - statistics, 20
- personal injuries, 34, 39
- picking and storing rock, 32
- plant, transfer of, 24
- pockets, shipping ore from, 33
- postage, 8
- power, electric, 28
 - tramming by, 32
- printing and stationery, 8
- production and shipments, 21
 - daily report, 21
 - monthly report, 22
 - steam, 28
- profit and loss, account, 5
 - miscellaneous, 13
 - supplies, 17
- prospecting, 9
- pumping, 33, 38
- purchased, supplies, 18

Oliver Iron Mining Co. (Cont'd)

- railroad tracks, 34
- ranges, iron mining, 1
- receipts, 21
 - and disbursements, 21
- receivable accounts, 6
- records of supplies used, 46
 - transactions, 41
- rentals, 8
 - machinery, 25
- repairs, 31
 - general, 38
 - locomotives and cars, 37, 38
 - steam shovels, 37
- report of production and shipments,
 - daily, 21
 - monthly, 22
- reports to general office, 47
- rock, development in, 32
 - filling, 33
 - picking and storing, 32
 - statement book, ore and, 43
 - in the orebody, 39
- royalty, 5
- salaries, 8
- schedule for construction accounts, 10
- shipping ore from pockets, 33
- shipments, 23
 - production and, 21
 - daily report, 21
 - monthly report, 22
- shop expense, 31
- shortages, overruns and, 23
- shift bosses and timekeepers, 33, 37, 38
- skip tenders, cage and 33
- sorting ore, stocking and, 33
- special expense, 9
- stationery, printing and, 8
- statistics, payroll, 20
- steam production, 28
 - shovel, loading stockpile, 33
 - operation, 33, 37, 38
 - repairs, 37, 38
- stocking and sorting ore, 33
- stockpile expense, 39
 - ledger, 44
 - loading by hand, 33
 - steam shovel, 33
- stopping, 32
- storing rock, picking and, 32
- stripping, 34

Oliver Iron Mining Co. (Cont'd)

- contract, 38
 - and development, 37
 - expense, general, 38
 - by hand, 37
 - supply accounts, 16
 - supplies consumed, 17
 - labor charges etc., a transfer, of, 24
 - manufactured, 17
 - mining, 16
 - profit and loss, 17
 - purchased, 18
 - used, record of, 46
 - vouchers debit and credit to, 42
 - surface expense accounts, under-
 - ground mines, 33
 - general, 34
 - vouchers charged to mining and, 43
 - surveying and chemistry, 34, 39
 - taxes, 14
 - teaming, 31, 37, 38
 - telegraph, telephones and, 8
 - timbering, 32
 - timebooks, 44
 - timekeepers, shift bosses and, 33, 37, 38
 - track expense, 37, 38
 - tracks, railroad, 34
 - underground, 33
 - tramping by hand, 32
 - power, 32
 - transactions, record of, 41
 - transfer of plant, 24
 - supplies, labor charges, etc., 24
 - traveling and entertainment, 9
 - underground expense, general, 33
 - tracks, 33
 - upper ports, cost of ore at, 6
 - ore at, 5, 18
 - vouchers charged to mining and
 - surface, 43
 - debit and credit to supplies, 42
 - operating, 51
 - warehouse, 34, 37, 39
 - wastepile expense, 37
 - water supply, 37, 38
 - winter expense, 36
 - work, experimental, 9
- Operating accounts, 169**
- mine ledger, 150
 - schedule for, 130
 - expense, 6, 61
 - locomotives, 37, 38

Operating Accounts (Cont'd)

- steam shovels, 33, 37, 38
 - tramway, 151
- Operations, coke, record of, 267**
- coke ovens, report of, 256
 - comparative statement of, 230
 - and development, supplies charged to, 130
 - mine, report of, 256
 - mine, record of, 267
 - monthly report of, 230, 260
- Openings, system of numbering mine, 317, 329, 332**
- Orders, job, 118**
- office, 126
 - purchase, 123
- Ore, breaking, 285**
- and crushing, 34
 - and coke, delivering expense, 177
 - development in, 32
 - hoisting, 291
 - ledger, 43
 - at lower ports, 5, 18
 - cost of, 6
 - at the mines, 5, 18
 - cost of, 6
 - moistures, 188
 - from pockets, shipping, 33
 - register, 313
 - reserves, calculation of, 333
 - and rock statement book, 43
 - shipments received, 188
 - in stock, 190
 - stocking and sorting, 33
 - unloading, 179
 - at upper ports, 5, 18
 - cost of, 6
- Orebody, removing rock in, 39**
- Other expense, 286**
- Ovens, charging, 213**
- coke, 206
 - firing cold, 214
 - repairs to coke, 214
- Overruns and shortage, 23**
- Payable, vouchers, 58, 278, 283**
- Pay checks, 116**
- Payday curves, 157**
- Payrolls, 19, 115, 186, 209, 223, 239, 270, 279, 283, 300**
- deductions, 223, 242
 - deficiency, 209
 - distribution of coke oven, 247, 248

Payrolls (Cont'd)

- mine, 244, 248
- statistics, 20
- Pedigree records, 111**
- Permanent equipment, 279**
- Personal injuries, 34, 39**
 - claims, 208
 - fund, 209
- Physical reports, 312**
- Picking and storing rock, 32**
- Pipe and fittings, 105**
 - lines, 287
- Plant account, 283**
 - transfer of, 24
 - steam, 75, 93
- Platting surveys, 328**
- Pockets, shipping ore from, 33**
- Portland Gold Mining Co., methods of**
 - accounting, 275
 - account, gold, 279
 - plant, 283
 - stable, 287
 - victor mill, 297
 - accounts, distributed mine, 288
 - head office, ledger, 277
 - mine, 282
 - receivable, 278, 283
 - sub-mine, 285
 - accounting, general statement, 297
 - ammunition order, 294
 - assaying and sampling, 295
 - auxiliary hoists, 289
 - balance sheet, 281
 - blacksmith shop, 288
 - boiler room, 288
 - breaking ore, 285
 - buildings, 286
 - carpenter shop and surface, 288
 - cars and rails, 287
 - capital stock, 278
 - cash, 278, 283
 - cash book, 297
 - compressing, 288
 - cost of gold at the mint, 276
 - sheet, general, 313
 - cross-cuts, 286
 - development, 283
 - sheets, stope and, 313
 - disbursements, receipts and, 281
 - distribution of labor, 300
 - sheets, 283
 - distributed mine accounts, 288
 - dividends, 279

Portland Gold Mining Co. (Cont'd)

- unclaimed, 280
- drainage tunnel, 279
- drifts, 286
- drills, machine, 288
- electric plant, 280
- engaging labor, 297
- equipment, permanent, 279
- expense, general, 280, 296
 - legal, 280
 - mining, 279
 - office, 280, 296
 - other, 286
- explosives, 287, 294
- financial statement, 280
- fixtures, furniture and, 279
 - office, 287
- freight, 286
- fuel, 287, 294
- furniture and fixtures, 279
- general expense, 280, 296
- gold account, 279
 - cost of at the mint, 276
 - ore, mining and milling, 275
- haulage system, waste, 291
- head office, ledger accounts, 277
- headworks, 287
- hoist report, 290
- hoists, auxiliary, 289
- hoisting, 285, 290
- hospital, 285
- houses, ore, 291
- insurance, 280, 283
- invoices, 307
- labor, distribution of, 300
 - engaging, 297
- legal expense, 280
- lighting, 295
- litigation, 280
- loss and gain, 278
- lumber and timber, 287, 294
- machine drills, 288
 - shop, 288
- machinery, 287
- machineman's report, 288
- material received register, 307
- mill, Victor, 279
 - Portland, 279, 286
- milling, 283
 - gold ore, mining and, 275
- mine accounts, 282
 - distributed accounts, 288
 - sub-accounts, 285

Portland Gold Mining Co. (Cont'd)

- mining expense, 279
 - and milling gold ore, 275
- miscellaneous, 280
- office expense, 280, 296
 - fixtures, 287
- officers' salaries, 280
- ore, breaking, 285
 - houses, 291
 - register, 313
- other expense, 286
- payable, vouchers, 278, 283
- payroll, 279, 283, 300
- permanent equipment, 279
- physical reports, 312
- pipe lines, 287
- plant account, 283
- Portland mill, 279, 286
- powderman's report, 294
- printing, stationery and, 280
- profit and loss statement, 281
- property, 278
- pumping, 295
- purchase orders, 307
- rails, cars and, 287
- raises and winzes, 286
- receipts and disbursements, 281
- receivable, accounts, 278, 283
- records, stores, 307
 - used, 309
- register, material received, 307
 - ore, 313
 - voucher, 297
- rents, 280
- repairs, 296
- report, hoist, 290
 - machineman's, 288
 - powderman's, 294
 - shipping, 313
 - timberman's, 292
 - watchman's, 312
- reports, physical, 312
- salaries, 280
 - officers', 280
- sampling, assaying and, 295
- securities, 278
- shafts, 286
- shipping reports, 313
- shop requisitions, 303
- stable account, 287
- statement, financial, 280
 - profit and loss, 281
- stationery and printing, 280

Portland Gold Mining Co. (Cont'd)

- stock, capital, 278
- stope and development sheets, 313
- stoping, 283
- stores records, 307
 - used records, 309
- storehouse, 287, 307
- supplies, 280, 285, 295
- surface, carpenter shop and, 288
- surveying, 296
- taxes, 280
- timber, lumber and, 287, 294
- timbering, 285, 292
- timberman's report, 292
- timekeeping, 298
- tools and appliances, 287
- trammer's tags, 291
- tramming, 285, 291
 - Victor mill, 286
- tunnel, drainage, 279
- unclaimed dividends, 280
 - wages, 280
- Victor mill, 279, 297
 - tramming, 286
- voucher register, 297
- vouchers payable, 278, 283
- wages unclaimed, 280
- waste haulage system, 291
- watchman's report, 312
- winzes, raises and, 286

Postage, 8

- and stationery, 62

Powder report, 159

Powderman's report, 294

Power, electric, 28

- and machinery, 206
- drills, 79
- house, 214
 - expense, 177
- light and, 76, 94
- tramming by, 32

Printing and stationery, 8, 208, 280,

Production and shipments, 21

- report of, 21, 22
- statement, 190
- steam, 28

Profit and loss, 210, 272, 273

- account, 5
- general, 234
- miscellaneous, 13
- statement, 281
- supplies, 17

Progress books, 332

- Progress report, 332
- Property, 278
 - cost of, 206
 - engineering, 209
 - mining, 60
- Props, timber and, 212
- Prospecting, 9, 208
 - machinery for, 207
- Pumping, 33, 38, 85, 94, 151, 295
 - expense, 177
- Purchase orders, 123, 307
 - of supplies, 121
- Purchased supplies, 18, 248
- Purchasing agent, office, 105

- Rails, cars and, 287
- Railroad tracks, 34
- Raise and winze card, 321
- Raises and winzes, 286
- Ranges, iron mining, 1
- Recapitulation of shipments, 224
- Receipts, 21, 62
 - boarding house, 208
 - and disbursements, 21, 281
 - and expenditures, boarding house, 252
- Receivable, accounts, 6, 61, 74, 278, 283
 - notes, 61
- Record, boiler room, 174
 - of coal mined, 238
 - electric power, 178
 - freight received, 124
 - hoisting, 86
 - of mine operations, 267
 - of operations, coke, 267
 - power drill, 81
 - rent, 254
 - rock hoisted, 86
 - supplies used, 46, 127
 - tramming, 83
 - of transactions, 41
 - voucher, 108, 180
 - water treatment, 174
 - of yardage, 238
- Records, diamond drilling, 98
 - graphic, 153
 - job, 119
 - office, 338
 - pedigree, 111
 - rent, 93
 - sampling, 161
 - stock, 126
- Records, stores, 307
 - used, 309
 - summary of hoisting, 88
 - supplies, stock, 248
 - survey, office, 327
- Recording engineering data, Calumet & Arizona Mng. Co., 317
- Boston & Montana Con. C. & S. Mng. Co., 325
 - field notes, 326
 - forms used for, 317, 325
 - geological data, 335
- Reference, labor investigation, 183
- Refinery results, 190
- Register, check, 108
 - material received, 307
 - ore, 313
 - voucher, 297
- Regrinding, 94
- Renewal fund, special, 209
- Rent account, statement of, 254
 - records, 93, 254
- Rental of equipment, 131
- Rentals, 8
 - machinery, 25
- Rents, 89, 95, 208, 280
- Repair of buildings, 178
 - dwellings, 178
- Repairs, 31, 296
 - to buildings, 214
 - and chutes, 212
 - cars, 211
 - coke ovens, 214
 - general, 38
 - to locomotives and cars, 37, 38
 - machinery, 212
 - steam shovels, 37
 - track, 211
- Report, animal, 255
 - blasting, 154, 157
 - of coal mined and distribution, 268
 - coke oven operations, 256
 - compressor, 79
 - coupon, 272
 - daily labor, 164
 - machine, 164
 - development, 134
 - distribution of power drills, 80
 - of drills sharpened, 80
 - drilling, 163
 - electric plant, 76
 - forage, 256

- Report, furnace, 173
 - gas analysis, 174
 - hoist, 290
 - machine drill, 161
 - machineman's, 288
 - mill, 103
 - mine, 133
 - general, 164
 - operations, 256
 - mineral, 103
 - nationality, 134, 256
 - of operations, 230, 260
 - production and shipments, 21, 22
 - progress, 332
 - powder, 159
 - powderman's, 294
 - rock trammed, 83
 - shipped, 66
 - sales, 269
 - shift foreman's, 159
 - shipping, 223, 261, 313
 - smelter, 173
 - steam plant, 75
 - supply, 103
 - of supplies used, 223
 - timberman's, 292
 - tool sharpening, 160
 - trammer bosses, 82
 - watchman's, 312
 - weighmaster's, 261
- Reports, accident, 134
 - boarding house, 223
 - to general office, 47
 - made at general office, 223
 - mineral and mass copper shipped, 67
 - physical, 312
 - received from mines, 222
 - rock shipped, train, 66
- Requisitions, supply, 123
- Results, refinery, 190
- Rock, development in, 32
 - filling, 33
 - hoisted, monthly record, 86
 - summary of, 88
 - house, 88
 - in orebody, removing, 39
 - picking and storing, 32
 - shipped, train reports, 66
 - statement book, ore and 43
 - trammed report, 83
- Rolls, 94
 - rooms and, 211
- Ropes, hoisting, 106
- Royalty, 5
- Rules, aid fund, 70
- Salaries, 8, 62, 280
 - and expense, general office, 207
 - officers, 280
- Sales report, 269
- Saloon buildings, 207
- Sampling, assaying and, 295
 - expense, ore, 179
 - records, 161
- Saw mill, 210
- Schedule for construction accounts, 10, 95
 - development accounts, 130
 - operation accounts, 130
- Screens and elevators, 94
- Securities, 278
- Selling, smelting and, 62
- Settlements, 112
- Shafts, 286
 - and tunnels, 150
- Shift bosses and timekeepers, 33, 37, 38
 - foreman's report, 159
- Shipments, 23
 - of ore received, 188
 - production and, 21
 - reports, 22
 - recapitulation of, 224
- Shipped, coal and coke mine and, 267
- Shipping ore from pockets, 33
 - reports, 223, 261, 313
- Shop accounts, 74
 - expense, 31
 - requisitions, 303
- Shortage, overruns and, 23
- Situation, applying for, 183
- Sketch card, 319
- Sketches, underground, 330
- Skip tenders, cage and, 33
- Slag, hauling expense, 178
- Smelter report, 173
- Smelting copper ore, 168
 - and selling, 62
- Smithing, 210
- Sorting ore, stocking and, 33
- Special expense, 9
- Stable account, 287
- Stamping, 68, 102
- Stamp mill, closed accounts, 93
 - fuel, 106
 - supplies, 106

- Statement, financial, 62, 230, 273, 280
 - profit and loss, 281
 - of rent account, 254
- Stationery, coupon books and, 270
 - postage and, 62
 - and printing, 8, 208, 280
- Statistics, payroll, 20
- Steam plant, 75, 93
 - report, 75
 - production, 28
 - shovel, loading stockpile, 33
 - operation, 33, 37, 38
 - repairs to, 37, 38
- Steel, iron and, 105
- Stock, capital, 58, 278
 - ore in, 190
 - records, 126
- Stocking and sorting ore, 33
- Stockpile expense, 39
 - ledger, 44
 - loading by hand, 33
 - steam shovel, 33
- Stope books, office, 327
 - card, 321
 - and development sheets, 313
 - maps, 324
 - total cards, 320
- Stopping, 32, 98, 150, 283
- Store Co., Wasatch, 203, 268
 - fixtures, 269
- Storehouse, 287, 307
- Stores records, 307
 - used records, 309
- Storing rock, picking and, 32
- Stripping, 34
 - contract, 38
 - and development, 37
 - expense, general, 38
 - by hand, 37
- Sub-accounts, 95
- Subscription, 60
- Sundry labor, 69
- Superintendence and clerks, 212, 213
- Supplies, 74, 152, 181, 223, 280, 285, 295
 - construction, charged to, 130
 - consumed, 17
 - electric, 106
 - general, 105
 - labor charges, etc., transfer of, 17
 - loss and gain on, adjustment, 106
 - manufactured, 17
 - manufacturing, 106
- Supplies, mining, 16
 - operation and development, charged to, 130
 - profit and loss, 17
 - purchased, 18, 248
 - purchase of, 121
 - stamp mill, 106
 - stock records, 248
 - transfer of equipment and, 221
 - used, 249
 - record, 46, 127
 - report, 223
 - vouchers, debit and credit to, 42
- Supply accounts, 16
 - report, 103
 - requisitions, 123
- Surface, carpenter shop and, 288
 - expense, 68, 151
 - accounts, underground mines, 33
 - general, 34
 - vouchers charged to mining and, 43
 - waste, 152
- Survey calculations, 326
 - cards, 318
 - office records, 327
- Surveys, platting, 328
- Surveying, 296
 - and chemistry, 34, 39
 - field books, 325
- System of numbering mine openings, 317, 329, 332
- Tables and vanners, 94
- Taxes, 31, 37, 38, 69, 208, 272, 280
- Team account, company, 88
- Teams and wagons, 269
- Teaming, 31, 37, 38, 74
 - timber, 152
- Telegraph, telephones and, 8
- Tests, fuel oil, 176
- Timber, lumber and, 105, 152, 287, 294
 - and props, 212
 - teaming, 152
- Timbering, 32, 83, 151, 285, 292
- Timberman's report, 292
- Timebooks, 44, 184
 - and timekeeping, 112
- Timekeeping, 235, 298
 - shift bosses and, 33, 37, 38
 - timebooks and, 112
- Tonnage and earnings, 224
 - estimated, 268

- Tonnage and labor chart, 152
- Tool sharpening report, 160
- Tools, 106
 - and appliances, 287
- Tracings, 324
- Track expense, 37, 38
 - repairs to, 211
- Tracks, cars and, 151, 206
 - railroad, 34
 - underground, 33, 83
- Train reports, rock shipped, 66
- Trammed, report of rock, 83
- Trammer bosses report, 82
- Trammers tags, 291
- Tramming, 82, 151, 285, 291
 - by hand, 32
 - monthly record of, 83
 - of power, 32
 - victor mill, 286
- Tramway, chutes and trestles, 206
 - new, 151
 - operating, 151
- Transactions, record of, 41
- Transfer of equipment and supplies, 221
 - plant, 24
 - supplies, labor charges, etc., 24
- Transportation, 65
- Traveling and entertainment, 9
- Treasurer, 209, 269
- Treasurer's account, 68
- Trestles, tramways, chutes and, 206
- Trial balance, 62
- Tunnel, drainage, 279
- Tunnels, shafts and, 150
- Unclaimed dividends, 280
 - wages, 209, 223, 280
- Underground cars, 83
 - expense, general, 33, 85
 - sketches, 330
 - tracks, 33, 83
- Unloading ore, 179
- Upper ports, cost of ore at, 6
 - ore at, 5, 18
- Utah Con. Mining Co., features of
 - accounting, 149
 - accounts, operating, mine ledger, 150
 - blasting report, 154, 157
 - boilers, 151
 - buildings and fixtures, 151
 - cars and tracks, 151
 - compressor, 151
 - Utah Con. Mining Co. (Cont'd)
 - contract curves, 154
 - copper ore, mining, 149
 - curves, contract, 154
 - payday, 157
 - development, 150
 - drill machine report, 161
 - drilling report, 163
 - electric lights, 151
 - engineering department and laboratory, 151
 - expense, general, 151
 - surface, 151
 - exploring, 150
 - explosives, 152
 - fixtures, buildings and, 151
 - fuel, 152
 - general expense, 151
 - office, 152
 - graphic records, 153
 - heating, 151
 - hoisting, 151
 - labor chart, tonnage and, 152
 - report, daily, 164
 - laboratory and engineering department, 151
 - lights, electric, 151
 - lumber and timber, 152
 - machine drill report, 164
 - report, daily, 161
 - machinery, 151
 - mine report, daily general, 164
 - mining copper ore, 149
 - new tramway, 151
 - office, general, 152
 - operating accounts, mine ledger, 150
 - tramway, 151
 - payday curves, 157
 - powder report, 159
 - pumping, 151
 - records, graphic, 153
 - sampling, 161
 - report, blasting, 154, 157
 - daily labor, 164
 - machine, 164
 - drilling, 163
 - machine drill, 161
 - mine general, daily, 164
 - powder, 159
 - shift foreman's, 159
 - tool sharpening, 160
 - sampling records, 161

Utah Con. Mining Co. (Cont'd)

- shafts and tunnels, 150
- shift foreman's report, 159
- stoping, 150
- supplies, 152
- surface expense, 151
 - waste, 152
- teaming timber, 152
- timber, lumber and, 152
 - teaming, 152
- timbering, 151
- tonnage and labor chart, 152
- tool sharpening report, 160
- tracks, cars and, 151
- tramming, 151
- tramway, new, 151
 - operating, 151
- tunnels, shafts and, 150
- waste, surface, 152

Utah Fuel Co., methods of accounting, 203

- abstract, bills collectable, 215
 - voucher, 215
- account, closed, 214
 - depreciation, 209
 - expense, 269
 - general plant, depreciation of, 208
- accounts, ledger, general office, 205, 206
 - Wasatch Store Co., 269
- accounting, general office, 214
- methods of Wasatch Store Co., 269
 - mine office, 235
- additional expenditures, details of, 235
- animal reports, 255
- animals, depreciation of, 210
 - killed and sold, 209, 223, 255
- auxiliary records, 210, 213
- balance sheet, 234, 273
- bills collectable, 251
 - abstract of, 215
 - ledger, 215
- boarding house expenditures, 208
 - fixtures, 206
 - receipts, 208
 - receipts and expenditures, 252
 - record of meals served, 251
 - reports, 223
- books and stationery, coupons, 270
- buildings, 206, 269
 - and chutes, repairs to, 212
 - repairs to, 214
 - saloon, 207

Utah Fuel Co. (Cont'd)

- burning and drawing, 213
- cars, repairs to, 211
 - and tracks, 206
- cash book, 214, 268
- charging ovens, 213
- chutes, repairs to buildings and, 212
 - and trestles, tramways, 206
- cinders, loading, 214
- clerks, superintendence and, 212 213
- closed account, 214
- coal and coke mined and shipped, 207
 - cost to consumers, 204
 - expense, sub-accounts, 210
 - mined and distribution, report of, 268
 - record of, 238
 - mining and making coke, 203
 - sales ledger, 215
 - used, 213
- coke, cost to consumers, 204
 - expense, 207
 - sub-accounts, 213
 - experiments, 214
 - loading, 213
 - making, mining coal and, 203
 - mined and shipped, coal and, 267
 - operations, record of, 267
 - ovens, 206
 - cost sheet, 224
 - repairs to, 214
- collectable, bills, 251
- companies and individuals, 210, 272
 - subsidiaries of Utah fuel, 203
- comparative statement of operations, 230
- corrections, journal of, 268
- cost of coal to consumers, 204
 - coke to consumers, 204
 - property, 206
- cost sheet, coke ovens, 224
 - mine, 230
- coupon, report, 272
- coupons, books and stationery, 270
 - outstanding, 272
- Current liabilities, 274
- dead work, 212
- deductions, payroll, 223, 242
- deficiency, payroll, 209
- depreciation, 222, 272
 - account, 209
 - of animals, 210

Utah Fuel Co. (Cont'd)

- of general plant account, 208
- details of general expense, 222
- development, mine, 206
- discount and exchange, interest, 209
- distribution of coal mined, report of, 268
 - coke ovens, payrolls, 247, 248
 - labor, 238
 - mine payrolls, 244, 248
- drainage and watering mine, 211
- drawing, burning and, 213
- driving entry, 211
- earnings, 207, 269
 - estimated tonnage and, 268
 - tonnage and, 224
- electric lights, 211
- engineering, 212, 213
 - property, 209
- entry driving, 211
- equipment, transfer of supplies and, 221
- exchange, interest, discount and, 209
- expenditures, boarding house, 208
 - receipts and, 252
- expense account, 269
 - coal, sub-accounts, 210
 - coke, 207
 - general, 207, 208, 213
 - law, 207
 - mine, 207
 - mining, 210
- expense, details of general, 222
 - extraordinary, 216
 - general office, salaries and, 207
- experiments, coke, 214
- financial statement, 230, 273
- firing cold ovens, 214
- fixtures, boarding house, 206
 - store, 269
- forage report, 256
- fund, personal injury, 209
 - special renewal, 209
- general expense, 207, 208, 213
 - expenses, details of, 222
 - office accounting, 215
 - salaries and expenses, 207
- hauling, 210
- improvements, 219
- incidentals, 213, 214
- income account, 231, 234, 273
- individuals and companies, 210, 272

Utah Fuel Co. (Cont'd)

- injury claims, personal, 208
 - fund, personal, 209
- insurance, 208, 272
- interest, discount and exchange, 209
- invoices, 216, 250
- journal, 215, 268
 - of corrections, 268
- labor distribution of, 238
- lands, 206
- law expense, 207
- ledger, 215, 268
 - accounts, Wasatch Store Co., 269
 - bills collectable, 215
 - coal sales, 215
- liabilities, current, 274
- loading, 211
 - cinders, 214
 - coke, 212
- machinery for prospecting, 207
 - power and, 206
 - repairs to, 212
- meals served, record of boarding house, 251
- merchandise bought, 269
 - sales, 269
- mill-saw, 210
- mine cost sheet, 230
 - development, 206
 - expense, 207
 - office accounting, 235
 - operations, record of, 267
- mined, coal and coke, and shipped, 267
- mines, coal, 203
 - reports received from, 222
- mining coal and making coke, 203
 - expense, 210
- nationality report, 256
- office accounting, general, 215
 - general, ledger accounts, 205, 206
 - reports made at, 223
- operations, coke, record of, 267
 - coke ovens, daily report of, 256
 - comparative statement of, 230
 - mine, daily report of, 256
 - record of, 267
 - monthly report of, 230, 260
- ovens, charging, 213
 - coke, 206
 - firing cold, 214
 - repairs to coke, 214
- payrolls, 209, 223, 239, 270

Utah Fuel Co. (Cont'd)

- deductions, 223, 242
- deficiency, 209
- distribution of coke ovens, 247, 248
 - mine, 244, 248
- personal injury claims, 208
 - fund, 209
- power house, 214
 - and machinery, 206
- printing, stationery and, 208
- profit and loss, 210, 272, 273
 - general, 234
- property, cost of, 206
 - engineering, 209
- props, timber and, 212
- prospecting, 208
 - machinery for, 207
- purchased, supplies, 248
- recapitulation of shipments, 224
- receipts, boarding house, 208
 - and expenditures, boarding house, 252
- record of coal mined, 238
 - mine operations, 267
 - operations, coke, 267
 - rent, 254
 - of yardage, 238
- records, supplies, stock, 248
- renewal fund, special, 209
- rent account, statement of, 254
 - record, 254
- rents, 208
- repairs to buildings, 214
 - and chutes, 212
 - cars, 211
 - coke ovens, 214
 - machinery, 212
 - track, 211
- report, animal, 255
 - of coal mined and distribution, 268
 - coke oven operations, daily, 256
 - coupon, 272
 - forage, 256
 - mine operations, daily, 256
 - nationality, 256
 - of operations, monthly, 230, 260
 - sales, 269
 - shipping, 223, 261
 - of supplies used, 223
 - weighmaster's, 261
- reports, boarding house, 223
 - made at general office, 223

Utah Fuel Co. (Cont'd)

- received from mines, 222
- rolls, rooms and, 211
- rooms and rolls, 211
- salaries and expense, general office, 207
- sales report, 269
- saloon buildings, 207
- saw mill, 210
- shipments, recapitulation of, 224
- shipped, coal and coke mined and, 267
- shipping reports, 223, 261
- smithing, 210
- statement, financial, 230, 273
 - of rent account, 254
- stationery and printing, 208
 - coupon books and, 270
- Store Co., Wasatch, 203, 268
 - fixtures, 269
- subsidiary companies, 203
- superintendence and clerks, 212, 213
- supplies, 223
 - purchased, 248
 - stock records, 248
 - transfer of equipment and, 221
 - used, 249
 - report, 223
- taxes, 208, 272
- teams and wagons, 269
- timber and props, 212
- timekeeping, 235
- tonnage and earnings, 224
 - estimated, 268
- track, repairs to, 211
- tracks, cars and, 206
- tramways, chutes and trestles, 206
- transfer of equipment and supplies, 221
- treasurer, 209, 269
- trestles, tramways, chutes and, 206
- unclaimed wages, 209, 223
- ventilation, 211
- voucher abstract, 215
- vouchers, 209, 217, 269
- wages unclaimed, 209, 223
- wagons, teams and, 209
- Wasatch Store Co., 203, 268
 - ledger accounts, 269
- watering mine, drainage and, 211
- weighmaster's report, 261
- work, dead, 212
- yardage, record of, 238

- Vanners, tables and, 94
Ventilation, 211
Victor mill, 279, 297
 tramming, 286
Voucher abstract, 215
 record, 108, 180
 register, 297
Vouchers, 111, 209, 217, 269
 charged to mining and surface, 43
 debit and credit to supplies, 42
 operating, 51
 payroll, 58, 278, 283

Wages, unclaimed, 209, 223, 280
Wagons, teams and, 209
Warehouse, 34, 37, 39
 expense, 178
Wasatch Store Co., methods of account-
 ing, 268
 accounts, expense, 269
 ledger, 269
 balance sheet, 273
 books and stationery, coupons, 270
 buildings, 269
 companies, individuals and, 272
 coupon report, 272
 coupons, books and stationery, 270
 outstanding, 272
 current liabilities, 274
 depreciation, 272
 earnings, 269
 expense accounts, 269
 financial statement, 273
 fixtures, store, 269
 income accounts, 273
 individuals and companies, 272

Wasatch Stove Co. (Cont'd)
 insurance, 272
 liabilities, current, 274
 merchandise bought, 269
 sales, 269
 payrolls, 270
 profit and loss, 272
 account, 273
 report, coupon, 272
 sales report, 269
 statement, financial, 273
 stationery, coupons, books and, 270
 store fixtures, 269
 taxes, 272
 teams and wagons, 269
 treasurer, 269
 vouchers, 269
 wagons, teams and, 269
Wash account, 95
Waste haulage system, 291
 pile expense, 37
 surface, 152
Watchman's report, 312
Water supply, 37, 38, 88, 210
Water treatment record, 174
Watering mine, drainage and, 211
Weighmaster's report, 261
Winter expense, 36
Winze card, raise and, 321
Winzes, raises and, 286
Wood, boiler, 106
 family, 106
Work, dead, 212
 experimental, 9

Yardage, record of, 238

RETURN TO the circulation desk of any
University of California Library
or to the
NORTHERN REGIONAL LIBRARY FACILITY
Bldg. 400, Richmond Field Station
University of California
Richmond, CA 94804-4698

ALL BOOKS MAY BE RECALLED AFTER 7 DAYS

- 2-month loans may be renewed by calling
(510) 642-6753
 - 1-year loans may be recharged by bringing
books to NRLF
 - Renewals and recharges may be made 4
days prior to due date.
-

DUE AS STAMPED BELOW

MAY 12 1997

12,000 (11/95)

OCT 15 1990 M

LD 31-109m-8, 34

YC 24763

257743

HF5686

M6 C5

THE UNIVERSITY OF CALIFORNIA LIBRARY

